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ORIGINAL ARTICLES

MALNOURISHED CHILDREN*

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EVERYONE now accepts the view that there are fundamental similarities in the physiologic processes of man and the lower animals. Almost all that we know about human physiology is based upon the deductions from experimental results obtained with animals. In a similar manner we have derived our knowledge of the principles of nutrition.

But the animal in the experimental laboratory is in an entirely different environment than that of the child with whom we are so seriously concerned.

In the study of the nutrition problems of the children of school age, we find that there are important essentials other than the diet in maintaining growth.

Perhaps no one has made a greater contribution to nutritional work than Dr. Wm. R. P. Emerson of Boston, who has given fifteen years to the study of the conditions of this group of children. The fundamental principles of Dr. Emerson's method in nutrition work is based upon the fact that every child requires a certain body weight to support his height.

Any child 7 per cent underweight for height is malnourished and is a sick child and should be so classed. One frequently hears assertive statements made that a standard of weight for height is all wrong and that some children were intended to be just naturally "skinny" like their father. Such a statement, however, never comes from a real student of children who has actual experience in the treatment of malnutrition.

Dr. Geo. Newman, the Chief Medical Health Officer of England, says, "Malnutrition is one of the gravest evils of the child's physique. The

*Read before the American Society of Orthodontists, Kansas City, Mo., March 18 to 21, 1924.

malnourished child tends to become disabled and unemployable, incapable of resisting disease or withstanding its onset and progress."

The accompanying pictures are taken from slides showing the results obtained in nutrition classes conducted by The Denver Tuberculosis Society.

Fig. 1 shows the back of a malnourished boy, 18 per cent underweight. Note the prominent shoulder blades, spinal curvature, and flat feet.

Fig. 2 shows the back of a malnourished girl, 10 per cent underweight for height. She is a typically malnourished child showing all the signs: fatigue posture, projecting shoulder blades, spinal curvature, flexed knees, protruding abdomen, flat chest, flat feet, lines under eyes, and serious expression.

Fig. 1.

Fig. 2.

Fig. 3 depicts a group of Junior High girls. Clothes hide the condition of the girls even from their own family. These girls at thirteen years are from ten and one-half to twenty-five and one-half pounds underweight. They look fairly well when dressed, but their backs show the condition demonstrated in Fig. 2. They are starting life with a handicap. In a nutritional class of twenty-two girls they made an average gain of ten and three-fourths pounds in twenty weeks.

In the cases shown in Fig. 4 poverty is not a serious factor. As much and often more malnutrition is found among the rich as among the poor. The elder sister is twenty-five pounds overweight and is thirteen years old.

Fig. 3.

Fig. 4.

The younger sister is seven and one-half pounds underweight and is ten years old. They come from a very poor family. But if poverty made one child thin it made the other one fat. The point was that one sister had a finicky appetite and refused to eat the plain simple food on which the other one thrived.

In Fig. 5 is seen St. Joseph's nutrition class. In a nutrition class the physician and nutrition worker try to determine why each individual child is underweight and then proceed to remove that cause and teach the child and parent proper food and health habits, check up on these each week for twenty weeks until the habits are established, stimulate the child's interest in weight gaining, and encourage the child in effort by the giving of stars, etc. A physical examination is given at once and physical defects corrected as soon as possible. The child writes out what he eats and the amounts of each

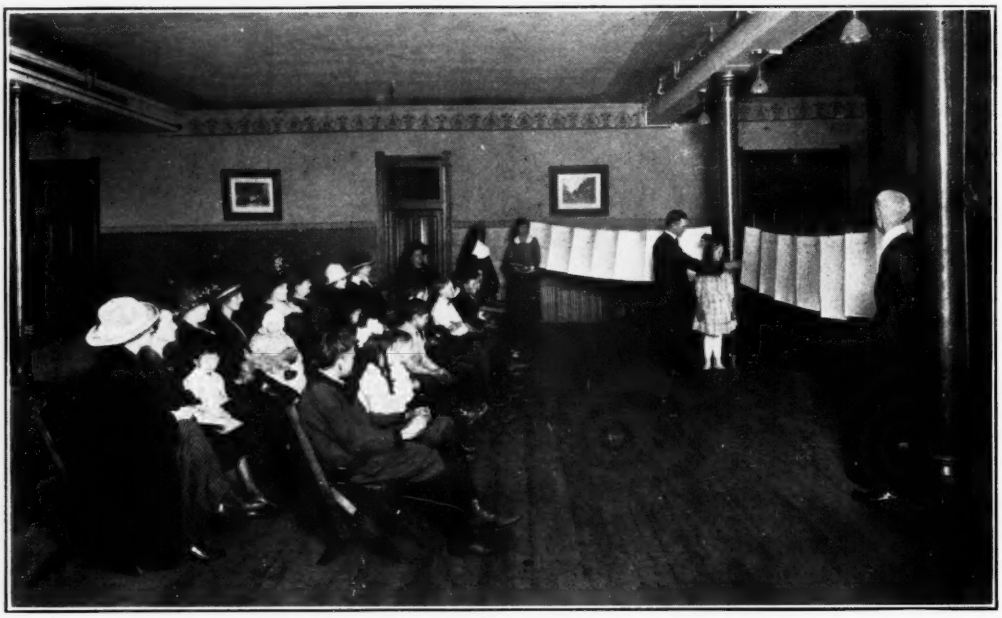

Fig. 5.

food for two days each week, and so the nutrition worker is able to find out if the child is taking enough of the right kinds of food to promote growth and development. Also the child's food preferences are noticed and by written suggestions the nutrition worker is usually able to get the child to gradually add more vegetables, cereals, dark breads, etc., to his diet and to omit foods that are harmful or hard to digest. Parents must attend classes as this work is really the parents' job and the nutrition workers are only to show them the way.

Fig. 6 is a picture of a chart. The upper left corner gives age, height, and weight on entering. The upper right corner gives number of pounds and percentage underweight, average weight for height and average height for age (to see if stunted). Dr. Emerson's list of five causes: (1) physical defects; (2) lack of home control; (3) overfatigue; (4) faulty food habits; (5) faulty health habits.

The chart is plotted into one-inch squares. Across each square is a week. Up and down each square represents one pound. The child's average weight for height is shown by a black line across the chart sloping up at the normal rate of gain for a child of that age. (Child has to make up number of pounds underweight and also keep up with normal gain of child of that age, to be normal at the end of twenty weeks.)

The child's weight curve is plotted in red, a dot for each weighing. The game is to get the red line over the black line and be a graduate and receive a diploma. The children are urged to go 10 per cent above their average weight line and are reweighed each week or two weeks and later, every month,

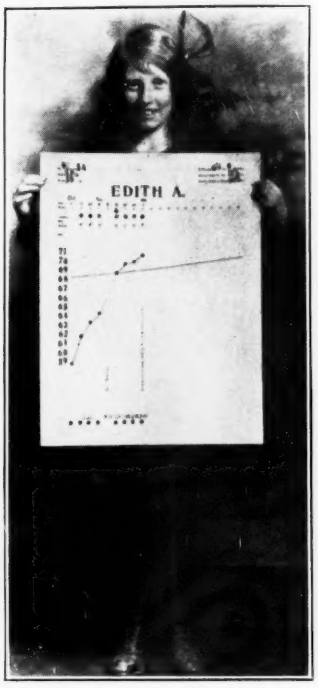

Fig. 6.

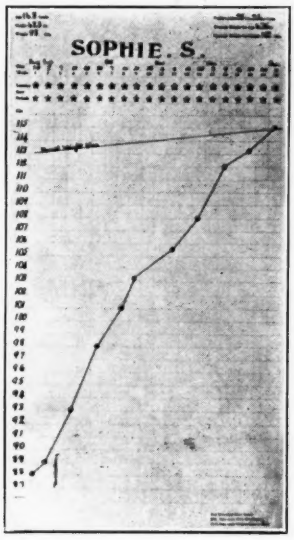

Fig. 7.

to be sure that nutrition balance is established. Last year 75 per cent held their gains.

The top line of stars represents lunch periods given if the child has taken milk and a Graham cracker at 10:30 A.M. and 3:30 P.M. each day of the week and has not missed one lunch.

The next line (blue) is given if the child has taken a twenty minutes' rest before the noon meal and forty minutes' rest before the evening meal each day.

The next line (gold) is given to the child that has made the biggest gain in class that week.

The line (green) at the bottom of the chart shows the attendance of parents at class meeting.

Also at the bottom of the chart are the number of calories. The average for the two days' diet list makes a general average of daily intake.

Any explanation for failure to gain, etc., such as being up late two nights or a tonsil and adenoid operation, is recorded.

Edith was our first graduate of the Emerson Institute. She gained at sixteen times the normal rate of gain.

In Fig. 7 is an example of "Four Forces" (Home, School, Medical Care, and the Child's Own Interest) working together. A nutrition worker took a girl into her own home. The program was followed to the letter, and she made a gain of twenty-seven pounds in twenty weeks. It shows what can be done when the "Four Forces" are working together.

Fig. 8.

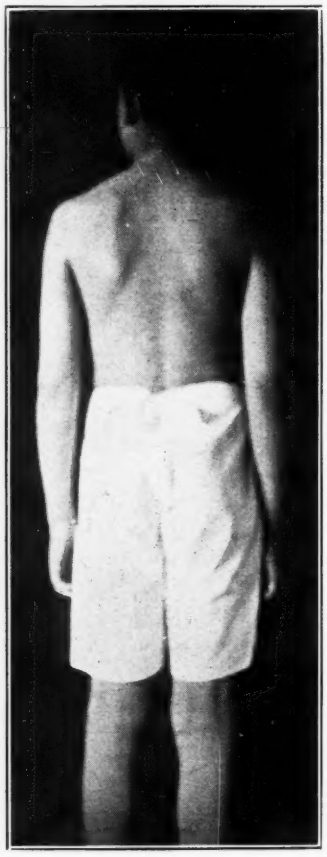

Fig. 9.

Figs. 8, 9 and 10 show us another case in which the "Four Forces" were working together. The boy had been to many doctors here and in the East for stomach trouble, and was on a very strict diet when he entered the class. His mother says the only difficulty now is to satisfy his appetite.

The school gave excellent cooperation by excusing the boy fifteen minutes before noon every day to allow him time for rest. His mother attended every meeting and saw to it that the program was carried out at home. The boy was very anxious to graduate. Our physician discovered that the stomach trouble was mostly a case of overfatigue and nervous indigestion. When the boy took rest periods before each meal there was no more trouble with the stomach. His older brother also carried out the program at home although not in the class and he gained fourteen and one-half pounds.

In Fig. 11 can be seen physical defects, all signs of malnutrition, and diseased tonsils and adenoids. This child had to be sent to the Junior League Nutrition House where her strength was built up before the tonsils were removed.

Fig. 12 shows the chart of a girl whose tonsils were the cause of underweight. Before the tonsils and adenoid operation there was a gain of two and one-third times normal. After the operation the gain was five and one-half times normal.

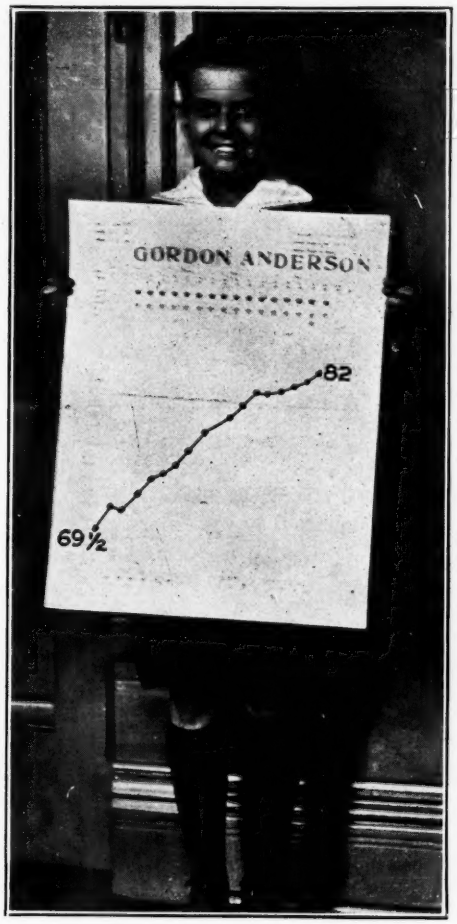

Fig. 10.

Fig. 13 shows another case in which the state of the tonsils were the cause of underweight. The family physician had tried for years to have these tonsils removed, but the father did not approve. Finally when the child's mother saw three drops in the weight line on the chart showing a loss of weight each time from colds and sore throats, she was convinced that the tonsils were a real source of trouble. The tonsils were removed during spring vacation and in the following three weeks the child gained nine pounds.

In Fig. 14 is presented a case in which lack of home control was the main cause in malnutrition. The girl was in a nutrition class for eighteen weeks and only made the normal gain for a child of her age to make. The doctor could find no physical cause, the school modified her program so that it was

not too difficult for her. The child was interested, and from the mother's story we seemed to be getting excellent cooperation from the home. There was some factor missing so we arranged for the child to go to the Junior League Nutrition House. The nurse there soon found the cause. The child would pick at her food, and only eat this and that, and when the nurse

Fig. 11.

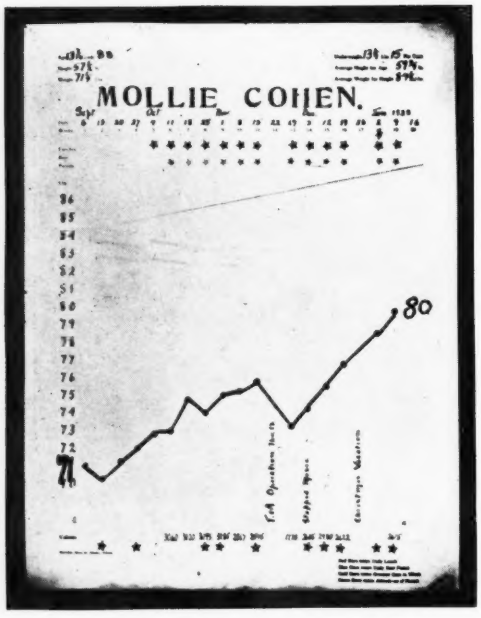

Fig. 12.

insisted that she must make a clean plate she remarked, "Why mother never made us eat what we didn't want to." While at the Junior League House she gained eight times the normal rate, and the mother attended the weekly meetings there and was convinced that her kindness had been mistaken, so when the child returned home again she gained five times the normal rate of gain. The mother had learned her lesson.

The chart in Fig. 15 demonstrates that rest is a more important element in nutrition than food. The child in this case ate well and took between-meal lunches and went to bed early, but in the first nine weeks she only gained one and one-half pounds. She was persuaded to take an hour's rest every morning and every afternoon during the Christmas vacation. She gained three pounds during the vacation and obtained a gold star and sat at the head of the class. A good deal was made of it and she was so thrilled that she took longer rest periods the next week and sat at the head of the class five times in the following few weeks.

We expected a diploma party one week when four children were to graduate, so Orale decided that she would like to be in that party and rested an hour and a half every afternoon, gained five and one-fourth pounds in the

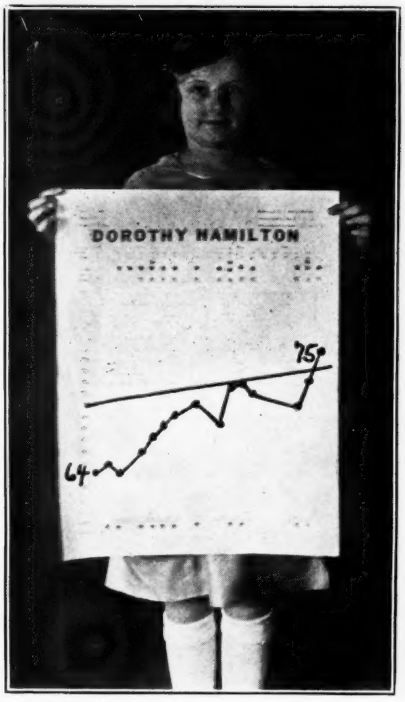

Fig. 13.

week and got her diploma. This was a ten months' gain for a girl of her age to make.

Mid morning and afternoon lunches are especially essential as they bring about a better distribution of food. A child will gain on these five meals a day while the child taking the same amount of food will lose on three meals a day.

Fig. 16 shows a case in which faulty food habits caused underweight. Sophie was a Junior High girl and had never eaten cereals or vegetables. She learned to eat these daily while a member of the nutrition class and gained at five times the normal rate and grew in height at twice the normal rate. She put the whole family on the program, even a brother at the university. A year later she took the highest all around standing for work, physical development, and civic spirit of any girl in the school.

Rats need milk for growth as do children (Fig. 17). Note the difference in size, fur and disposition of the rats that have had milk as compared to rats from same litter that have not had milk. Milk is an essential food for children. No other food can take its place. Every young animal needs milk. It promotes growth and helps to fight disease. Milk also contains more lime than any other food.

The chart in Fig. 18 shows the increase in weight after the correction of faulty health habits. Although a physician's son, the boy was sleeping with windows closed. This was not discovered until several weeks after he entered

Fig. 14.

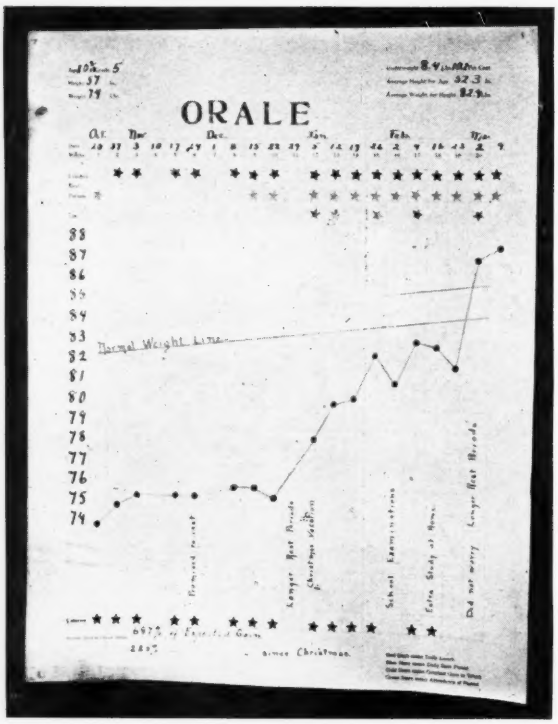

Fig. 15.

the Open Air School at the suggestion of the school physician as his physical condition was so poor. After he was persuaded that the night air would not hurt him and would help him gain in weight, he kept his windows open and gained steadily.

Fig. 19 shows the Denver Orphans' Home. The program can easily be adapted by an institution and the children all derive benefit. A nutrition class was conducted here for twenty weeks last spring. The matron attended every meeting as did the housekeeper, and nurse and the chairman of the Medical Board. Three lectures were given to the Board of Trustees and the staff on the care of the underweight child. The diet was adapted to meet their needs and general instruction was given about food. Twenty-two chil-

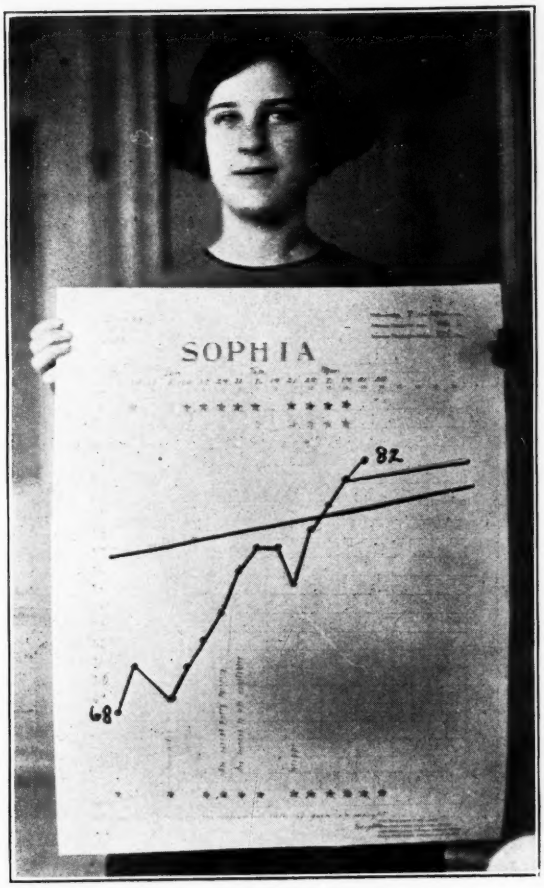
SOPHIA
82
68

Fig. 16.

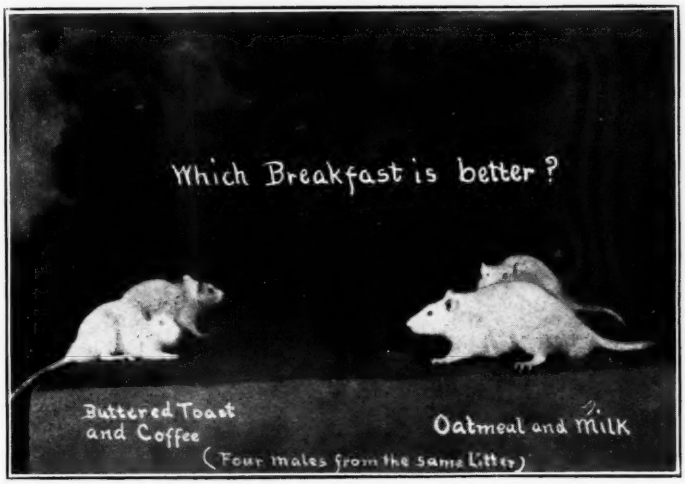
Which Breakfast is better?
Buttered Toast and Coffee
Oatmeal and Milk
(Four males from the same Litter)

Fig. 17.

dren were brought up to their average weight for height. In fall, when the children were weighed again, we felt that they were receiving such intelligent care that it was only necessary to weigh them once a month, and meet them then to show their progress in some graphic way. (A horse race was used and each child was represented by a horse that moved a mile on the track for every pound gained.) So far eleven children have been brought up to

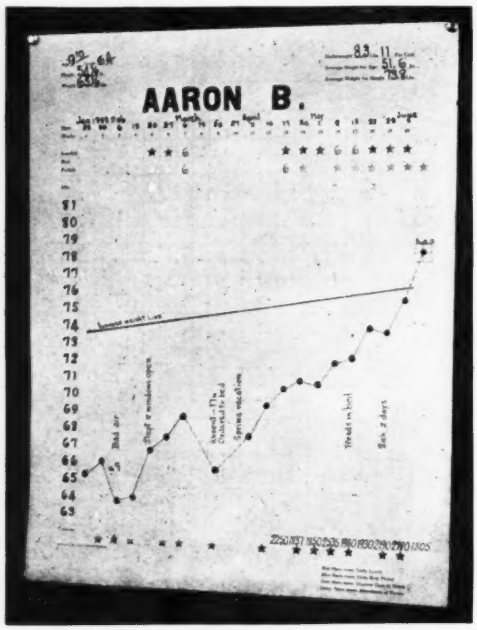

Fig. 18.

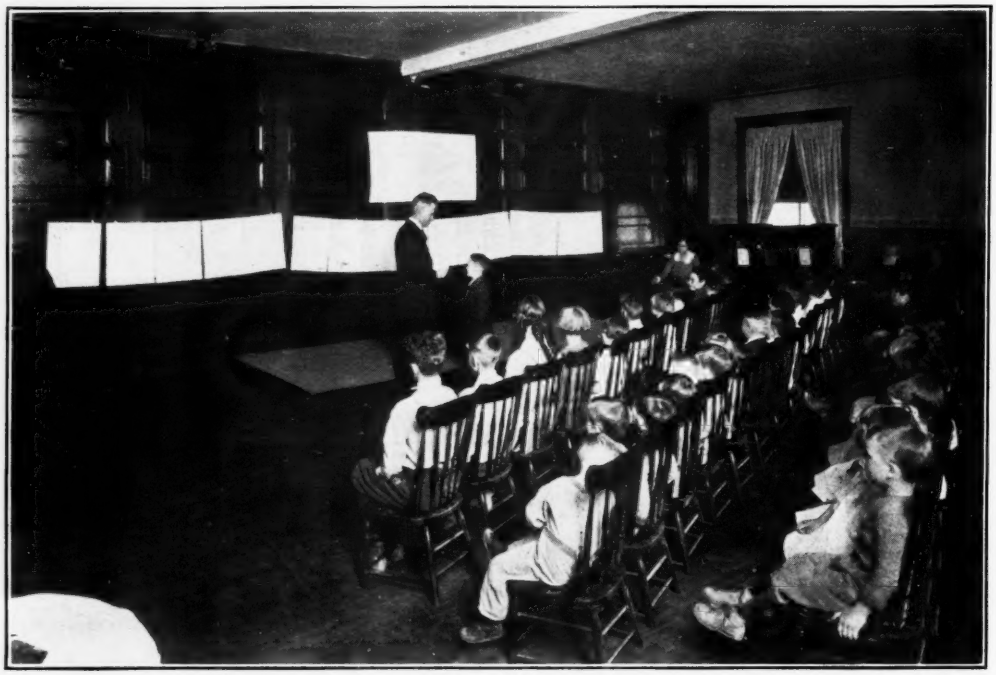

Fig. 19.

their average weight for height and twenty-six changed from seriously underweight to the borderline group (1 to 6 per cent).

Fig. 20 shows one of the class at Denver Orphans' Home. This girl was at Junior High School and was fifteen years old. Both parents died of tuberculosis. Margaret was thirteen pounds underweight and six inches over height. She gained at nine times the normal rate of gain and came up to normal weight for her height, even though it was six inches over height. She made a two and one-third years' gain in twenty weeks.

Fig. 20.

Fig. 21 shows a gain of sixteen and three-fourth pounds in seven months, of a pupil at the Open Air School. There was a marked change in hair, color, skin and expression.

Figs. 22, 23 and 24 show Ermanine, whose father died of tuberculosis. For the three years following she did not gain an ounce. She weighed between seventy-two and seventy-three pounds. As soon as a nutrition class was organized her mother enrolled her at once, and for the first few weeks she did not follow the program and no gain resulted. Upon following the program she started to gain rapidly. She only lost from worry when her mother was in hospital for an operation and when she had chickenpox. The child gained twenty-two and three-fourths pounds in twenty-one weeks and

is still gaining although not in a class. When weighed exactly one year to the day from the time of entering the class Ermanine had made a total net gain of thirty-one pounds, after remaining at the same weight for three years.

The school principal reports the most marked change in appearance, disposition and school work of any child she has ever known in all her school experience.

Fig. 25 shows a Junior High girl who was seven and one-half pounds underweight, one inch underheight. She gained eleven pounds in eight weeks, reaching the normal weight line, and grew one-fourth inch in height. She received her diploma, but continued to weigh each week and follow the pro-

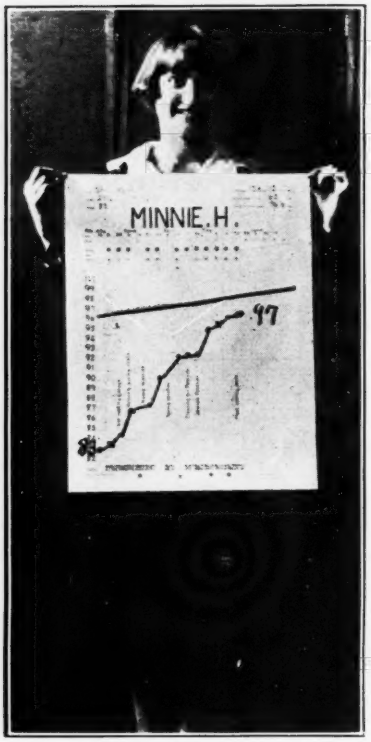

Fig. 21.

Fig. 22.

gram. In the next seven weeks she gained four pounds and grew three-fourths inch. When the general nutrition was improved she compensated for her underheight condition very rapidly. The teachers reported a marked change in her studies.

Fig. 26 shows marked signs of malnutrition in a pupil of the Open Air School at the time of his entrance. He was eight pounds and 10 per cent underweight. His age was twelve years. Examination showed: granular pharynx, cryptic tonsils, enlarged anterior cervical glands, congested throat, enlarged postcervical glands, and irregularity of the action of the heart. 2nd pulm. accentuated. Slight lateral curvature, round shoulders, flat funnel chest, and flat feet. His family reported that he had been underweight for six years, was very restless sleeper, had poor appetite and was finnicky about

food. He did not drink milk. He used to sit around and did not want to go out and play. He was nervous, cried easily, irritable and easily upset. Because of family trouble we were unable to arrange for the removal of tonsils for some time. Before tonsil and adenoid operation he gained five pounds in twelve weeks. After the operation he gained four pounds in four weeks. He reentered the Open Air School in September and gained twelve pounds in eighteen weeks. There was a marked change in appearance and school work, and especially in disposition. The family say he is a different boy.

The Denver Tuberculosis Society has conducted twenty-four nutrition classes in the past year with 520 children enrolled. One hundred and fifty physical defects were corrected and fifty-four children graduated.

Fig. 23.

Fig. 24.

The Open Air School is also run by the Denver Tuberculosis Society. Last semester thirty-one children made a gain of 261 pounds in twenty weeks. Their average per cent underweight on entering was 10.6. The average per cent underweight at end of the semester was 4.6.

All these children were referred to the Open Air School because of congestion of lungs or serious heart trouble. Ten children reached their average weight for height.

In a Senior High School class the school has given the girls (many are from twenty to thirty pounds underweight) a fifty minute rest period in the morning since the girls have gained at forty times the normal rate of gain or 400.6 per cent.

Throughout our country one-third of the children are habitually underweight and present both physical and mental signs of malnutrition.

Malnutrition is due only in a minor degree, to poverty, inheritance, tuberculosis, or other obscure diseases. The great majority is due to adequate causes such as physical defects, errors of home and social life, overfatigue and improper food habits. This makes the work of correcting malnutrition, though partly medical, for the greater part educational.

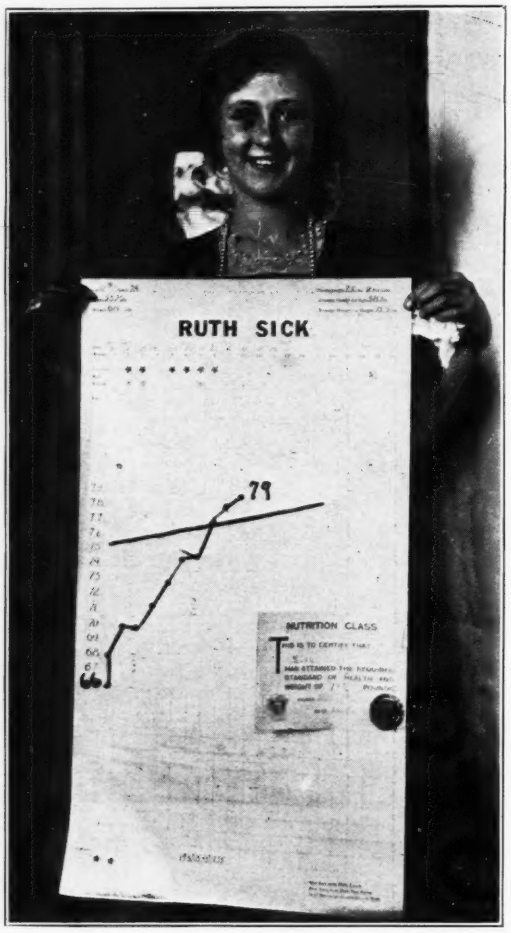

Fig. 25.

If this program as described by Dr. Emerson is adhered to, including as it does, the removing of physical and mental causes of poor nutrition, getting the children to take sufficient and proper food at frequent intervals, securing fresh air both day and night, preventing overfatigue and establishing sufficient home control to insure good food and health habits, the child should rapidly gain weight and become well and strong because of a powerful force of nature that makes for health.

McCullum says that "Irrespective of the agency which operates to improve the physical condition of our children, the work which is being done with the child of school or preschool age is essentially a salvaging operation. We may remove a focus of infection, free the child from difficult breathing,

Fig. 26.

Fig. 27.

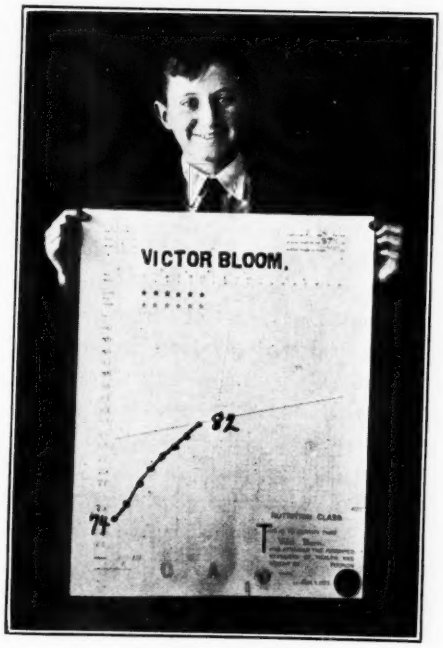

Fig. 28.

repair its teeth, or teach it personal hygiene, but we are at best only repairing for temporary service or affording temporary relief to a damaged human being.'' The opportune time to attain the maximum benefits of proper nutrition is in the prenatal life and early infancy.

From a dental standpoint, this is true. The period during which the teeth are forming is critical in the life of the child and the secret of preventive dentistry lies here in the proper diet of the mother during this period. Once the teeth are formed, they cannot be improved in a marked degree. Children seriously underweight are damaged human beings and probably will carry a scar through life after malnutrition is corrected. But the idea of the school nutrition clinic is to discover the pupils that are borderline cases, 7 per cent underweight, and teach them proper health habits.

In conclusion, I wish to call your attention to the fact that McCullum has demonstrated that the teeth and health of animals can be influenced by the manipulation of the diet, and through his research work we are in possession of knowledge which, if properly used, will gradually bring us back to the condition of satisfactory dentition enjoyed by our ancestors.

The proper use of this knowledge is through the medium of our educational institutions, the public schools and colleges. The sooner we inject the health and nutrition program in every grade school, high school and college in our land, the sooner we will be on the right road, and in the words of our President: ''To make growth more perfect; decay less rapid; form more beautiful; living more enjoyable; life more vigorous and death more remote.''

DISCUSSION

Dr. H. F. Hoffman.—I want to thank Dr. Brusse for this presentation. While I knew in a general way about what he had accomplished, I had not seen these slides before, although I have seen some of the charts. I am indebted to Dr. Brusse for my first enthusiasm in proper nutrition and diet. He started me on that tract. If such changes can be made in children as he has shown, (and I know they can be) it is worth while to stop and think what a benefit such treatment would be to our patients while they are in our hands or before we start treatment for them. It will shorten the time of orthodontic treatment; it will minimize our contact with sickness and make our work more cheerful in every way.

Dr. Eby.—The subject which Dr. Brusse has brought before us is one which cannot be regarded too seriously. The proper recognition and administration of this work is not only fundamental in orthodontia, but is potentially the greatest constructive phase among the similar sciences which have to deal with physical welfare.

A large percentage of all cases of malocclusion represent insufficiencies which are the result of inheritance, environment, nutrition, diet and regulative habits resulting from ignorance or neglect. How can we expect to produce the best physical changes in the tissues unless the proper structural substance is provided. Certainly no ambitious workman can strive for ideal results without a knowledge of the materials with which he is working.

This subject not only deals directly with the matter in point of the treatment of malocclusion, but extends our obligation into the equally, if not more important field of administering to the general physical welfare of children.

It is recognized that orthodontia is essentially a phase of dentistry, but at the same time it is one of the very greatest fields for the practice of preventive medicine.

Dr. Brusse's work is in accord with that of Dr. Wm. R. P. Emerson of Boston, who is devoting his life to specialization in child welfare. Dr. Emerson appeared before the New

York Society of Orthodontists at the December, 1923, meeting and gave us a wonderful insight into this work. His tables showing relative weight and height and charts regulating diet and habits should be mounted in every orthodontist's office and used constantly. These tables, compiled from observations upon thousands of children, reveal the fact that a child who is 7 per cent underweight or 10 per cent overweight for height cannot be regarded as normal.

Dr. Emerson proves the fact that it is not the quality or variety of food which determines the ultimate result through the channels of metabolism, but that with proper quality and variety of foods it is necessary to have fresh air, sunshine, rest, hygiene, recreation and proper mental as well as physical environment as equally valuable requisites to normal growth.

These charts may be procured from Dr. Emerson whose address is 144 Dwight Street, Boston, Mass, which with his book on the subject are invaluable to the orthodontist.

Dr. Brusse certainly possesses a very fine conception of this important phase of orthodontia and his methods should be adopted universally. He has brought us a very fine message and I trust that he will keep at this subject until every orthodontist has passed beyond the thought that the mere moving of malposed teeth is the extent of our service.

In behalf of the society I wish to again express special thanks to Dr. Brusse.

Dr. J. D. Locke.—I would give a good deal now if I were capable of discussing this paper in an intelligent way. I have seen this work followed up where I practice, in Grand Rapids. Everything that Dr. Brusse has said I have seen substantiated.

We have a preventorium in Grand Rapids; it is disassociated from tuberculosis work. I have seen children gain as much as five pounds in four days under treatment.

The rest periods and five meals a day of which Dr. Brusse speaks are absolutely essential to bringing the child up to normal weight. This is not only an important thing in orthodontia, I think it is one of the most serious problems with which we have to deal generally.

There is no man in practice here today who does not have his host of little children under treatment who are suffering from the same conditions which Dr. Brusse has described to us.

Dr. Brusse (closing).—Men have read and discussed scientific papers on diet for the past five years. You can listen until doomsday to papers concerning the diet, study them, and in the end it will not do very much good. This society is too small—even the medical societies are too small to put this subject across to the public. It seems to me that any institution or agency that is interested in his work and is educating the children of this country concerning proper diet, should be given our cooperation.

DECIDUOUS TEETH AS FACTORS IN NORMAL DEVELOPMENT*

By Dr. Martin Dewey, New York City, N. Y.

DURING a period of enthusiasm I promised I would prepare a paper for this society on the subject of "Deciduous Teeth as Factors in Normal Development." At the time I made the promise I had gone over considerable material which was being prepared as lantern slides for college work. The abundance of such material on hand caused me to make this promise, but when I attempted to place the subject matter in readable form without the use of lantern slides, I found it much more difficult that I had at first imagined. The material in question had been obtained from the orthodontic clinic of the College of Dental and Oral Surgery and the Dewey School of Orthodontia. The patients for this clinic come from the east side of New York, not from the poorest element of the slums, but by no means from the best residential section.

A great many of these malocclusions are indirectly traceable to the early loss of deciduous teeth, which cause a large number of unilateral developments. The analysis of these various cases can be very easily followed by lantern slides, but in a paper without slides it will be necessary to generalize to a certain extent.

I think it has been quite universally accepted that the deciduous teeth have at least two important functions. The first is to act as organs of mastication during the early life of the individual; the second is to act as stimulating factors through use in the development of the osseous structures, thereby causing such a growth as will accommodate the permanent teeth. To these two functions might be added a third, which is very noticeable in the children whom we see in the clinic, and that is, the deciduous teeth as factors not only in the development of the structures supporting the teeth but as factors which have a metabolic part in the development of the individual. It has been my observation in study of the children of the orthodontic clinic, that a youngster who is undernourished to the greater extent is the child who has unfortunately lost the deciduous molars at an early age. We see a large amount of underdevelopment associated with malnutrition caused by the destruction of the deciduous arch, making it impossible for the youngster to masticate his food, consequently producing a decided malnutrition with the resulting underdevelopment of the individual. Not only are the dental arches underdeveloped, but we find a decided lack of weight in the child of that age compared with a normal youngster of the same age. This can be readily understood when we realize that these children are compelled to live on the same type of food as those who possess all their teeth; consequently, the inability of these children to properly masticate the food that is supplied to

*Delivered at the European Orthodontological Society.

them because of an early loss of deciduous teeth, results in an underdevelopment from malnutrition of the entire structure. Very often this loss of deciduous teeth in these children is accompanied by the loss of one or more permanent molars. We are referring especially to the first permanent molars, and as a result of this added calamity the malnutrition of the youngsters continues over a longer period and a consequent maldevelopment through later years.

When we speak of deciduous teeth as factors in the development of the dental arch, we must remember the stimulating effect which these teeth produce as organs of mastication, and also the action which they have through the inclined planes of the cusp and the approximal contact. If one deciduous molar is lost prematurely, just that much of a stimulating effect has disappeared, the cusp relation is destroyed and the approximal contact broken. Because of the loss of approximal contact the teeth drift together and cause a shortening of the dental arch, which in turn results in abnormal development of the arch and face. We see a large number of impacted premolars resulting from the early loss of the deciduous teeth, which also causes a closing of approximal spaces. There is a lack of proper arch development because of the improper use resulting from the loss of the deciduous teeth, to which may be added the general underdevelopment and malnutrition occurring in the child because of the inability to masticate his food properly.

A few years ago I made the statement that if I were given any case that had lost any particular deciduous tooth at a certain age, I could describe the malocclusion which would develop at the age of twelve. This fact has been so thoroughly proved, and so many men have observed these conditions, that it is unnecessary at this time to burden you by reciting a large number of cases with a certain type of malocclusion. This would be more or less monotonous without lantern slides to show the case.

The particular point which I want to impress upon you, which a great many of you have undoubtedly observed, is that the deciduous teeth are factors of development not only locally as a result of mechanical stimulation through mastication, but if the harmony of the deciduous arch is broken and the masticating apparatus destroyed, the effect is not only local but constitutional, because of insufficient mastication resulting from a loss of those teeth. Therefore, when we think of the deciduous teeth as factors in normal development, we not only refer to the important part which they play in the development of the dental arches, but also the great action which they play in the development of the entire individual. This is very easily studied if you have access to a number of children who have lost deciduous teeth as compared with those who have normal dentitions. It is our duty to impress upon parents the necessity of preserving all the deciduous teeth in order that the patient may develop normally.

DISCUSSION

The President said that Dr. Dewey being absent he would not take it upon himself to reply to any discussion, but would do what he could to answer any questions that might be asked.

Dr. Wheeler thought it might be of interest to the members to know under what conditions the clinic had been carried on. The Orthodontia Clinic of which Dr. Dewey was the head had been under the department of which he (Dr. Wheeler) had charge for many years and, therefore, he knew the conditions thoroughly. The great difficulty in the clinic had been found in keeping the children attending regularly over the period of time necessary to accomplish the work, and the problem had been dealt with by a method which probably would not apply to all institutions. During the time of the college course Dr. Dewey attended two or three times a week. He was not in favor of allowing a student to carry on a great deal of work except under the direct supervision of his superiors and that was done in all cases. During the summer time when the college was closed, for something like three or four months, Dr. Dewey had a postgraduate school and dealt with the same cases that he had had during the winter and carried them through, so that he had a continuous service. The question for all teaching institutions was to avoid loss. The average institution even if connected with the university had not a large amount of funds for such things. Instead of making a full payment for an appliance, the patient was allowed to pay in instalments. When the patient started he paid something like five to ten dollars, which was payment for a month, and at the end of that month he again made a similar payment. The feeling in the department was that every month the amount of time and material and overhead charges should be paid for by the patient, and an attempt was made to carry on the work at an expense that barely covered the cost of the institution. Most cases of orthodontia could not be carried on under an expense of approximately sixty dollars, but for that sum it was often possible to carry on from one to two years and accomplish very considerable results. In New York City the number of children under orthodontic treatment and unable to pay even such sums was stupendous. Bellevue Hospital had received an appropriation from the city of New York, with the consent of the State, of over three million dollars to build new buildings, and had throughout the city various branches, one of which was on the seashore, for tuberculous children. If the means and the men were available it would be possible to use twenty-five orthodontists on the work at that hospital, and then not to be able to cope with the situation. The opportunity for observation, comparison and experimental work in that institution was probably unsurpassed in any institution in America, and he was glad they had succeeded in securing Dr. Dewey as the orthodontist in charge of the work. There were young men also from the various institutions in America. There was only room for seven internes in Bellevue, and one at each of the branches. This year there were two men from the University of Michigan, one from the University of Pennsylvania, one from Minnesota, one from the College of Dental Surgeons, Toronto, and one from New York. They carried on the work, conferring with the visiting dentists; those engaged in orthodontia would confer with Dr. Dewey, and others would confer with Dr. Walker. The only payment received by the internes was their living; they had free rooms and their food and hospital clothing and their laundry, and they obtained an experience in all branches of dentistry. The institution had over 200 fractured jaw cases, and sometimes as many as thirty cleft-palate cases of children in a month. The student had an opportunity of seeing and working on everything in dentistry, and at the end of a year he had more experience than most students obtained in a private practice in ten years. If anyone could devise a plan whereby more orthodontia could be accomplished it would be valuable because that was the vital problem in dentistry today, to give a child a fair start with a complete set of masticating organs so that he would not be handicapped in his race for existence. In private practice the cost was so great that only the successful and fortunate people in life could avail themselves of orthodontic services, but there was a great mass needing attention in the east of New York—100,000 Italians and 100,000 Jews, many thousands of Hungarians of the more ignorant type, thousands of Greeks, Rumanians and people from the Balkans, all mixed up in a great seething mass of humanity and not knowing how to adjust themselves to the new conditions. The efforts of all great institutions in America were directed to save those people physically and mentally so that they might become good citizens, and dentistry had a part to play in that matter. Up to now scarcely any impression has been made on that mass.

Dr. W. Davenport said it seemed that Dr. Wheeler's problem was pretty well solved by his organization, and he thought in time that organization would develop on a large scale.

The President said it seemed to him Dr. Wheeler had an organization for solving the problem in New York which was applicable to any large city in America. Having started an organization it was possible by means of the application of general principles to solve the difficulties. Organizations were started in order to produce results and they had the benefit of something already established, which might and very possibly would produce a result far in excess of anything that could be produced in Europe, according to his own knowledge of what had been done. He did not know what had been done in Europe in that particular respect, but the only organization he knew of in England that was out to do good work such as had been described were organizations for helping poor people, not necessarily with regulating. He did not believe they had touched regulation at all. The main object of such philanthropic organizations was to try and do work cheaply to help adult people by making their mouths healthy by extractions or filling of teeth that had become septic, and the manufacture of plates.

Orthodontic treatment of children, apart from what was being done in England and Scotland, was infinitesimal, and he did not know what was being done in Ireland. The picture drawn of the masses of people in New York needing attention was the same picture that might be drawn all over Europe. In Europe it was bad enough before the war, but there were more poor people in England today then ever; the rich people were now poor and the middle classes were poorer still. The whole basis of treatment of orthodontic cases for a nation was a difficult one, but the general treatment and practice of orthodontia as taught in high-class organizations—he did not say whether it was correct or incorrect—as far as the application of those principles was concerned to the average mass of humanity was useless. Unless something was done quickly he thought the teaching of orthodontia and the treatment of orthodontia cases as far as Europe was concerned would fall very short of what the dental profession was called upon to do. It was a very large problem that required continual thinking out. It was extremely interesting to hear what had been done in America, and to find that Dr. Wheeler was connected with the schools and hospitals referred to by Dr. Dewey.

Dr. J. T. Quintero said that Dr. Wheeler had brought forward an interesting point with regard to the clinics in New York, and he might himself describe the work he had been doing with his father in Lyons. During the war a large part of France was invaded, and the people who lived in the north suffered a great deal from lack of food, and the children and the aged people were sent further back. At Lyons there were now quite a number of children, and he and his father had been taking care of their mouths since the war. So far they had seen about 1,200 children. The work had been going on for two and a half years, and on January 1, 1922, they had done something like between 7,000 to 8,000 operations, and he did not know how many operations had been done up to date. They did their best to save all the teeth and the percentage of extractions had been kept to about 14 per cent in the 7,000, which was a very low number indeed. They had not attempted any orthodontia. Unfortunately as he was the orthodontist in the office he had also to do the general work, and he found it was impossible to do orthodontia for children he only saw once a week. Putting on appliances under those conditions was practically impossible. The results that had been obtained had been very gratifying; so much so that the work had been extended considerably, and now it included the children of the working classes of a certain number of factories in Lyons. Those factories had been grouped to form two different associations, one amongst dyers and the other amongst different corporations. The associations made allowances to the fathers of families and the amount increased according to the number of children, so that it was a very good institution. The children of the working men numbered something like 12,000, and of those, his father and he had only seen 1,200 in about two years. That showed the enormous amount of work to be done and how difficult it was to do it. It would not be possible to do any orthodontia until people could be found available for the work. There had been very good results in the saving of teeth, and he thought by saving temporary teeth there would be a better race growing up.

INFLUENCE OF INFANT SUCKLING METHODS ON THE DEVELOPMENT OF THE MAXILLA AND ON THE PRODUCTION OF ADENOID CHARACTERISTICS*

By Dr. Sylvan Dreyfus

WE are all aware of the evil effects produced by the use of comforters and by thumb-sucking. We know what deformities are caused by these practices. What effect, therefore, can the feeding bottle have on those babies who are not suckled by their mothers? In order to have an idea of it let us make the following experiments. Let us suck one of our fingers, first by putting it entirely in our mouth, secondly by just putting the tip between our lips. If we place the tip of the finger between our lips and suck it, we notice that our lips press against our teeth; besides this, we feel that the mucous membrane of the palate swells. This is caused by the vacuum produced by suction on the cavity of the mouth. Let us now make the other experiment. Let us put the whole finger in our mouth and suck it. We shall notice that the lips exercise no pressure on the gingival arch. The work is done by the tongue, and as a result of the action of the tongue and of the foreign substance placed between the tongue and the palate, the roof of the mouth as well as the anterior portion of the maxilla will be pressed; this pressure will give a pointed shape to the roof of the mouth and will cause the incisors to project.

We would like to remind you that the following factors act on the mouth and maxillae:

1. Muscular action, tongue, cheeks, lips.

2. Atmospheric pressure acting on cheeks, lips and floor of nasal fossa.

Let us now consider the forces at work on the newborn baby when it is feeding.

I. SUCKING THE MOTHER'S BREAST

The nipple being short, suction of the mother's breast brings the lips up close to the gingival arch and also widens the gingival arch in front. As a result of this action, the vacuum produced in the mouth draws the palate and flattens it; consequently the floor of the nasal fossa drops and the fossa are enlarged. This action on the roof of the mouth is partly due, according to our observations, to the vacuum produced in the mouth while the infant is actually sucking, but it is also caused by atmospheric pressure acting on the floor of the nasal fossa. Sucking at the mother's breast requires not only strength in order to draw up the milk but, owing to the shape of the nipple, which is very short, it also calls for a powerful action of the lips, which have to be firmly pressed against it so as to exclude the air. The muscles of the

*Transactions of the European Orthodontological Society.

lips, and in particular of the orbicular, have to do the kind of exercise which will strengthen them and will enable them later on to fight against the teeth projecting. The action of the lips is strengthened in proportion to the smallness of the nipple. It is evident that if the nipple were large the lips would not have to make such an effort. It is quite easy to make such an experiment merely by sucking our little finger, then our thumb.

II. ARTIFICIAL BOTTLE SUCKING

As we saw in the second experiment which we put forward, when we put one of our fingers in our mouth in order to suck it, the foreign body which takes up the space between the tongue and the palate pushes the latter up. But in the act of sucking this is aggravated because the child sucks entirely

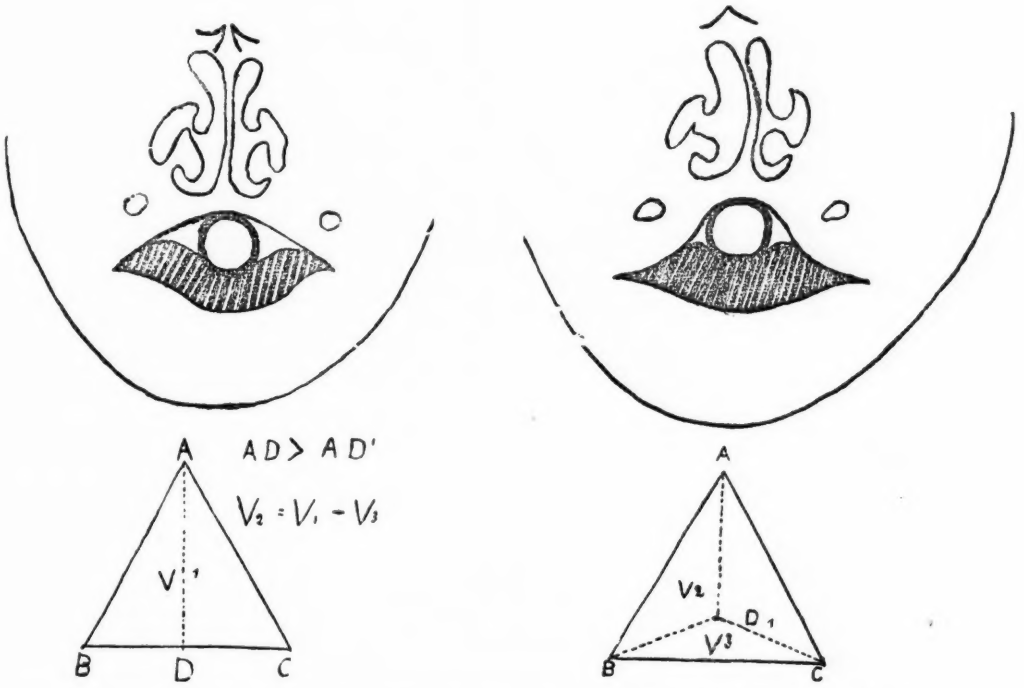

Fig. 1.—Different effects on the jaws by the use of nipples as shown in Figs. 2 and 3.

with its tongue; it exercises with it a certain amount of strength which also tends to push up the palate, thus decreasing the size of the nasal fossa.

Suckling does no only affect the roof of the mouth, it has also an influence on the mesial septum of the nasal fossa. It is evident that as the arch of the palate get drawn towards the mouth the distance between it and the frontal bone is increased and the septum will be more or less stretched. If, on the contrary, the arch of the palate is pushed up, the palato-frontal distance is decreased and the septum, for which there will not be sufficient room, will deviate in the shape of an *S;* this will further decrease the aperture of the nasal fossa.

I would like to draw attention to another fact, namely, that the infant who takes milk from the bottle draws up the milk simply by the action of its tongue and does not bring any muscular strength into play. The lips are not

exercised in any way and will be more or less atrophied. On the other hand, the child who is suckled by its mother is forced to exercise a certain amount of strength to draw the milk. This exercise will develop the muscles of the lips, which is of use later on.

This is more or less Rogers' method applied to sucklings. We all know that undeveloped nasal fossa are favorable to the development of adenoids, whilst largely developed nasal fossa allow of a perfect aeration of the upper part of the pharynx, and that, thanks to this aeration, infection of the adenoids and their hypertrophy is to a certain extent prevented. In the case of the undeveloped nasal fossa, on the contrary, the smallest obstruction causes mouth-breathing and the air in the upper pharynx is only renewed to a small

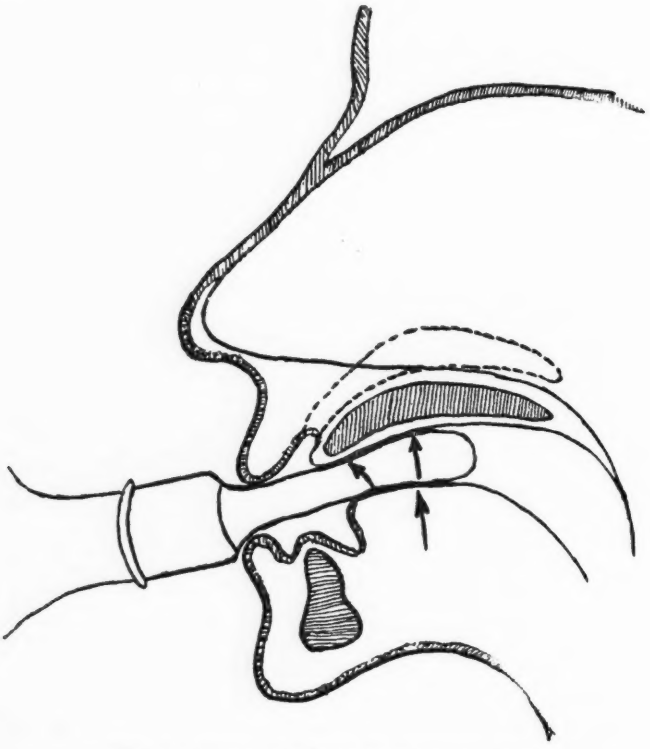

Fig. 2.—Type of nipple in common use.

extent, if at all. We are more or less confronted by a closed vessel favorable to adenoid infection and to their hypertrophy. We know that mouth-breathing is a sign of presence of adenoids, but even if there is no truth in this corollary we think nevertheless that mouth-breathing encourages the development of adenoids. Moreover, mouth-breathing is a direct cause of infection (sore throat, bronchitis, etc.). Besides which, artificial suckling provokes a pointed palate, projecting incisors, and causes up to a certain extent atrophy of the nasal fossa, and by this fact encourages the development of adenoids in children predisposed to them. Breast suckling, on the contrary, encourages the development of the maxilla and of the nasal fossa and to a certain extent prevents the development of adenoids. I do not say that the child will not have adenoids, but I am convinced of the beneficial action of this form of suckling.

A FEW HOSPITAL CASES

1. A child aged two months was put out to nurse. The foster mother lost her milk owing to a fright; from that time the infant was bottle-fed. Pointed palate, premaxillae very much developed, incisors projecting, open mouth, mouth-breathing, atonic lips, a perfect specimen of the adenoid subject.

2. A little girl five or six years of age was shown to me. Her jaw showed decided prognathism of the maxilla and she had a pointed palate. The child had had polypus in the nose for which she had been operated on. After the birth of the child the mother was very weak and was only able to suckle her for two months.

3. Another patient whose birth had been a very distressing one, face presentation, was only suckled for six weeks. The child, who could not

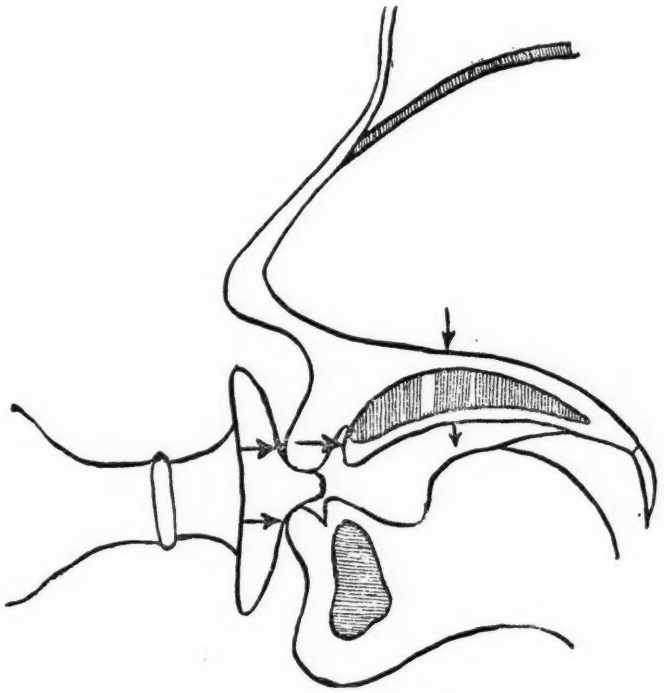

Fig. 3.—Author's form of artificial nipple.

tolerate milk, was given another food which had Nestlé's as a basis. As it was impossible to give him as much food as he wanted, he was given a comforter (see Dr. Pont's article in *Province Dentaire,* May-June, 1922). The child is not an adenoid subject but has all the appearance of it; he breathes through his mouth although he has no adenoids, and he had glands in his lungs.

4. A little girl has no adenoids, mouth-breathing, pointed palate, projecting teeth. The mother did not suckle her at all, or at the utmost only for one month. The child was always having sore throat or bronchitis. As she was prevented from breathing through her mouth during the whole of the winter the trouble did not occur.

To resume. Maternal suckling draws the roof of the palate down, whilst suckling by means of a common feeding bottle pushes it up and gives it a pointed shape. Maternal suckling gives a normal shape to the portion of the

maxilla as it flattens it, whilst bottle suckling makes the teeth stick out and produces a pointed *V*-shaped maxilla. Finally, maternal suckling encourages a normal development of the upper breathing channels, whilst bottle feeding tends to atrophy them as it decreases the amount of nasal power. Besides, in this case, incidents such as frequent bronchitis and sore throat are to be feared because of mouth-breathing.

CONCLUSION

I, therefore, advise mothers to suckle their babies as long as they possibly can, but if for any reason (weakness, ill-health, etc.) natural suckling is impossible, they should get a special rational feeding bottle of which I give you the following description:

It consists of a solid feeder (udder) shaped as near as possible like the female nipple, which, being very short, requires a powerful action from the suckling's lips while feeding, the lips having to be firmly pressed against the teat so as to ensure hermetic closing. The feeder (*a*) is provided at its base with a cap (*b*), which is of the same shape as the breast, so that by suction it rests on the suckling's gingival arch. Finally the (*b*) is terminated at its lower part by a connection (*c*) which allows of its being hermetically fitted to the neck of the bottle (*d*). The feeding bottle is made of an elastic aseptic material easily cleaned and unaltered, such as rubber or gutta-percha. It is scooped out inside and furnished with one or more drains (*e*) which end on the surface of the feeder (*a*). The suckling fed by means of this bottle finds himself faced by a small, solid and very short feeder (*a*) which forces him to contract his lips in sucking, especially the orbicularis muscle. On account of the vacuum produced in the cavity of the mouth the baby has to draw down the roof of its mouth and gives a normal shape to its nasal fossa, the results being thorough aeration of the upper part of the pharynx and prevention of mouth-breathing. By shaping the cap on the outlines of the maternal breast the gingival arch of the suckling is made to rest on the cap and this allows of a normal development of the maxilla and prevents the teeth from protruding.

I should like to point out another advantage of this feeding bottle. I know how difficult it is for mothers to wean their children; the baby being accustomed to its mother's breast will not and cannot take to the bottle owing to the fact that suction of the bottle is not the same as that of the breast. The baby, being accustomed to use its lips in natural sucking, does not know how to suck the type of bottle now on the market because, in order to suck such a feeding bottle, it must chiefly use its tongue. The sucking movement being the same with the rational feeding bottle described above, the baby will not have to be taught afresh, and weaning will become much easier.

The paper was discussed shortly in French by the President, Dr. d'Alise, and Dr. J. T. Quintero. Dr. Dreyfus briefly replied.

AN IMPROVED TYPE OF FEEDING BOTTLE*

By Dr. Sylvan Dreyfus, Lausanne, Switzerland

THE author, speaking in French, said the previous year he had exhibited a new type of feeding bottle on which he was working, but which at that time was only in an experimental stage.† He had since been hard at work upon it, and exhibited it that morning in its improved form. He did not propose to discuss again the theory he had previously propounded as to the deformities caused by bottles with the ordinary type of teat, and the difference between the physiologic movements of a child using one as compared with those involved when feeding at the breast. He wished to point out, however, that a child using the improved type of feeding bottle he had evolved made exactly the same movements as when feeding at the breast, whereas with the ordinary type the milk could be extracted much more easily and there was very little movement, so that the muscles were not properly exercised. He had tested the improved feeding bottle at the children's clinic at Lausanne, and had got midwives to adopt it, and the results had always been very satisfactory. A child who found difficulty in feeding from an ordinary bottle, because the movements required were different from those necessary in feeding at the breast, could manage very well with the improved bottle, and a child who had been using the improved bottle could feed at the breast without difficulty, whereas one used to the ordinary bottle would probably find it difficult to do so, because the movements required were different. Moreover, with the improved bottle a child would take from fifteen to twenty minutes to absorb the contents, whereas with one of the old pattern it could do so in five. The slower rate of feeding was very advantageous, while the additional muscular movements required assisted in no small degree the development of the mandible.

The speaker then exhibited several cinematograph films to illustrate his remarks. The first, which depicted a child using the ordinary type of bottle, showed how little movement there was of the mandible. The next, of a child feeding at the breast, showed the greatly increased muscular action necessary, while in the third, where the improved type of bottle was employed, the muscular movements were precisely similar, the movement of the muscles of the maxilla being particularly marked in both cases. The speaker pointed out that, owing to the slower rate at which the food was absorbed with the improved type of bottle there was much less danger of the child subsequently ejecting it. He also demonstrated how, owing to the construction of the teat, a valve, which always became foul, was unnecessary. The bottle, moreover, could be easily cleaned.

*Transactions of the European Orthodontological Society.

†See Fig. 3, page 905.

DISCUSSION

The President said he remembered Dr. Dreyfus bringing the subject forward at the last meeting in London. He believed the apparatus now exhibited was a decided improvement on that which was then shown, and was a brilliant effort to reproduce natural conditions artificially and exactly. If the invention would prevent the ill-effects which usually attended the employment of an artificial substitute, he ventured to prophesy that there was a great future before it.

Dr. Day (London) asked whether a valve was employed.

Dr. Dreyfus replied in the negative.

Dr. Day said that the up-to-date feeding bottles supplied by such firms as Allen and Hanbury had a valve at the far end to let in the air, and so facilitate the withdrawal of the milk.

Dr. C. d'Alise (Naples), speaking in French, said the dangers, both from an orthodontic and a constitutional point of view, of using the ordinary type of feeding bottle were well known; its use often gave rise to grave maladies which might even, on occasion, prove fatal. He congratulated Dr. Dreyfus on producing a bottle which should do away with those risks, and the utility of which had been demonstrated. The danger of using an ordinary bottle lay not only in the quality of the milk but in the movements, or lack of movement, required to obtain it; the new bottle, which required muscular action similar to that involved when feeding at the breast, did away with the latter difficulty.

Dr. B. M. P. Schroder (Paris), speaking in French, thought Dr. Dreyfus' invention was exceedingly interesting. It was usually thought that the only disadvantage of using a feeding bottle lay in the quality of the milk, but that was evidently not the case. He hoped the new bottle would speedily be made available to the public.

Dr. Quintero (Lyons), speaking in French, said Dr. Dreyfus' improved bottle was very interesting, particularly to himself, since he had a child young enough to be able to use it with advantage. As Drs. Schroder and d'Alise had said, there was not only the question of the quality of the milk, which was always inferior, but also that of the physiologic movements involved. At a national dental congress held at Lyons the previous year, the question of the use of comforters was raised, and their effect from a dental point of view considered. Of course, with a comforter the child got nothing, whereas with a bottle it got milk. He knew that in America bottles were employed very like the one Dr. Dreyfus had exhibited. He had never examined one closely, but had seen them. In shape, the American bottles resembled the breast, having in the middle a teat resembling a nipple, and the bottles were of large size. An attempt had already been made, therefore, to imitate nature more closely. He did not know what movements a child had to make with the American bottle, but thought that if that of Dr. Dreyfus were not in existence it would constitute a considerable advance on anything previously brought out, because its form was very much more like that of the natural breast. Dr. Dreyfus' bottle was exceedingly interesting, because, as was shown by the film exhibited, a child feeding from it had to make the same movements as if at the breast, except that perhaps they were a little more exaggerated; but that, he thought everyone would agree, was not a bad thing. He was glad, therefore, to congratulate Dr. Dreyfus on being able to show the completion of the work the beginning of which he had brought to the attention of the society the previous year. Personally, he had not been altogether satisfied with the earlier model, but in its improved form he found it very interesting and would take the earliest opportunity of testing its merits.

Dr. G. B. Hayes (Paris) thought the subject under discussion was closely connected with what Dr. Young had said on another occasion as to the correction of irregularities. It was necessary to get at the cause of irregularities, and it seemed to him that Dr. Dreyfus' invention might serve to prevent many irregularities. If the movement required with his bottle was a natural one it would prevent that drawing in of the lips and protrusion of the teeth which became a tendency even before the teeth were in position, and so save a great deal of trouble later. If that were the case, not only orthodontists but the general public should be informed of it, and in the interests of both it should be given

prominence. From the demonstration which had been given, he thought the bottle did all that was claimed for it, and he congratulated Dr. Dreyfus upon it.

Dr. W. S. Davenport (Paris) said he had three children who, unfortunately for lack of mother's milk had had to be bottle fed. If he had ever realized the difference in muscular action between breast and bottle feedindg he would have thought Dr. Dreyfus' bottle a godsend. Both he and his wife had large arches, but in the case of all three of his children they were very contracted, which might be attributable to the use of the ordinary type of bottle. He thought Dr. Dreyfus' invention was of the greatest importance as tending to prevent irregularities of the teeth, and should therefore be encouraged to the greatest possible extent.

Dr. Truman W. Brophy (U.S.A.) thought the subject under discussion was one of the most important that could possibly come before the society. He had been invited to New York the previous May to attend a meeting of the Department of Pediatrics of the New York State Medical Society, for the purpose of showing how children with cleft-palates might be fed and their lives preserved, and in that connection had taken up the question of malformations of the mouth due to improper feeding. What had been said that morning, and illustrated on the screen, was in absolute conformity with what he then said, though he had not been able to illustrate his remarks by means of moving pictures. He had exhibited, however, a nipple he had designed about twenty-five years ago and used ever since, extending its employment as widely as possible, to show how a child with a cleft-palate could be fed by having a vulcanite flange on the top of the nipple so as to close off the space in the mouth and enable it to draw in its food. He also showed another appliance, without a nipple, which the mother might make use of, and, which, when carried into the child's mouth became temporarily an obturator, so that she could hold the child to her breast and it would take its food quite well—so well, indeed, that the child got to know it could not take its food until the appliance was fitted. The device which Dr. Dreyfus had exhibited seemed to him to be a very desirable one, because it made the child work for its food and it did not get the milk too fast, while the pose of the bottle prevented it acting as a lever and levering out the maxilla while forcing the mandible backwards, making the teeth form an acute angle instead of an arc of a circle. He did not know how information with regard to Dr. Dreyfus' invention could best be given to the public. As had been said, all the dentists in Europe could not correct the irregularities of the children in Paris, and the same condition of affairs prevailed in every other city; thousands of children would pass through life with irregularities of the teeth because there were not enough orthodontists living to deal with even a small percentage of them. A good deal of propaganda was necessary, and personally he thought the best way of securing the adoption of Dr. Dreyfus' bottle was to enlist the cooperation of the obstetricians and medical men generally, and teach them a lesson they had never learned up to the present, namely how to make use of feeding bottles in such a way as to maintain an even pressure on the maxillary and mandibular jaws while the child was feeding, and not, as was shown on the screen, have it lying on a pillow with the bottle levering out the maxillary jaw and forcing the mandibular one backwards. It was important to get at the medical men, because they came in contact with the child and its family from birth. An orthodontist was not called in when a child was born because at that time it had no teeth, and then when it got the teeth they were out of shape and the orthodontist had work to do. It was a very good thing for orthodontists to be able to read Dr. Dreyfus' paper and make use of the knowledge they acquired, but that would not help the child whose parents had no knowledge of it. The only way of bringing the matter before the public that he could think of was via the medical press and practitioners.

Dr. Weinberger said he had been interested in the subject under discussion for a number of years. Personally, he did not think the bottle had a great deal to do with the condition; his studies in the maternity wards of different hospitals led him to believe that the origin was prenatal, and he had come across hundreds of cases of children with a mesial relation of the two jaws at birth which was clearly shown, by means of x-ray photograph, as existing prior to birth. That naturally led to the question of how the condition could be improved after birth. Dr. Brophy had said what a good thing it would be if the matter could be brought to the attention of the medical profession, the obstet-

ricians, and personally he agreed with him and considered the suggestion most interesting; but he thought it was necessary to go a step further. The position in which the child was carried before birth was of great importance. That was really a matter for the obstetrician. The influence it had on the arrested or overdevelopment of the face was not sufficiently realized. If the child's position was corrected and it was turned into a natural position, arrested development of the mandible could be overcome. In most cases, however, the child was born with the deformity, which had to be corrected after birth. Dr. Dreyfus' nipple would certainly be a great aid in extending and enlarging the mandible and the maxilla, and increasing the muscular development, which was the essential thing. He did not believe the faulty development could be ascribed to the bottle, because the child was born with it; it was not the bottle itself which brought about the condition. Dr. Dreyfus' invention, however, would be of the greatest possible use in helping to correct it.

Dr. Dreyfus, speaking in French, in reply, said Dr. Day had mentioned the use, in Allen and Hanbury's bottle, of a valve to facilitate the withdrawal of milk. It was unnecessary, however, to facilitate in any way the withdrawal of the milk, because that diminished the need for muscular action; it was desirable, on the contrary, that the child should have to suck hard to get the milk so as to bring its muscles into play. He always recommended that a child should be breast fed, if that were possible, for nothing could come up to that. He did not wish to pretend, moreover, that his bottle would correct all deformities; he knew there were cases of children who had fed at the breast for twelve months, but in whose mouths deformities were present. His bottle would not be universally effective, but it would correct deformities to a certain degree, and would stimulate muscular development. There was a danger with a bottle of the old-fashioned type that it would be pressed against the palate, and that the palate, which was very tender, would be raised, so diminishing the nasal passage and rendering the child more prone to such things as adenoids. Unfortunately, he had been unable to follow the discussion in English.

NEW CEPHALOMETRIC METHOD AND APPARATUS AND ITS APPLICATION TO ORTHODONTIA*

By Dr. Rudolph Schwarz, Basel

Part I

ANTHROPOLOGIC methods having gained entrance into orthodontia, a new method of taking measurements of patients is now available. In anthropology, the craniometer used for measuring the skull is especially well built. The cephalometer, which is used for measuring the heads of living beings is less accurate. On that account it is important to perfect the cephalometer so that its accuracy and value will be increased.

It is my aim to try and present this new technic. As a foundation for a new classification of malocclusion we must know the face and cranium. For this purpose we need a new measuring apparatus. The method Simon has introduced consists of placing a tray on the maxillae and provides a positive support on which to place the facebow after the plaster hardens.

Simon is very enthusiastic over this idea, yet I am not and neither are other writers so favorably impressed with the gnathostat because it is not a

*Translated by Dr. Margaret Gortikov from separate copy of the Swiss German monthly *Journal of Dental Surgery,* 1923, xxxiii, Ed. 9.

precision instrument. I have constructed my own gnathostat in combination with the Gyzi facebow which I wrote about in 1921[10] (Fig. 1). Since then I have improved my apparatus and so developed my method that I can determine the width, length, and height, of the head in its relation to the jaws and dental arches. These dimensions can be measured with a compass but the measurements obtained have no comparative value for jaw measurements.

With the new facebow the measurements establish points in accurate position on the jaws. This is a valuable contribution for the making of graphic maps, and it is now possible to accurately estimate the correlation between the jaws and the cranium in the human being. I am not satisfied, however, with only studying the relationship of the jaw to the eye-ear plane and orbital plane, but also obtain the width, length and height of the head, the morphologic height of the face, orifice and the entire profile angle with my measurements. By means of these measurements it is possible for me to obtain an important

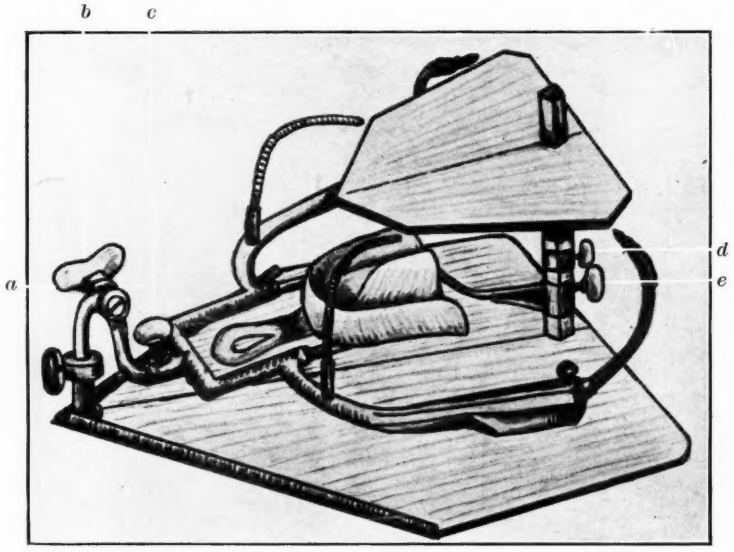

Fig. 1.

foundation for orthodontia and also a valuable anthropologic measurement of the head, which is important for obtaining the racial characteristics of our people.

The gnathostatic method for cephalometric jaw reproduction, as Simon calls it, works as follows: An impression is taken of the maxilla by means of a tray on which are soldered two guiding pegs (Fig. 2). After the impression hardens, the facebow is placed on the guiding pegs of the impression tray and is fastened with a screw. I have constructed a new facebow similar to the Gyzi bow, but with four firm vertical bars according to the horizontal needle system, instead of the flexible sprue lead. (Plate I, Fig. 1). Instead of the needle I use the screw which can be brought to rest at a definite point. Now it is possible for me to place the orbital screw accurately on the orbital point, and furthermore, it can be done without any harm to the eye. The individual placing of each particular point makes it very simple to take measurements on the patient. It has been correctly shown that the facebow should not be

constructed in accordance with the height of the ear-eye plane, but approximately with that of the occlusal plane by shifting this particular horizontal screw in a vertical direction. I can determine and note all the asymmetric points which are especially important for judging the malocclusion, and also for estimating the normal and abnormal development of the jaws. By means of two casings the oblique nasion is placed on both the orbital bars with the nasion screw. With it I can accurately determine the nasion point, while the bow for determining the height of the ear is set on the tragus bar by means of the ear height screw in order to estimate the height of the head.

To establish the length of the head posteriorly, another part of a bow is inserted which grasps the opisthocranium by means of a screw. In my newest facebow I have also inserted a screw to determine the subnasal points so as to be able to take measurements according to Korbitz,[5] and to mark the alveolar

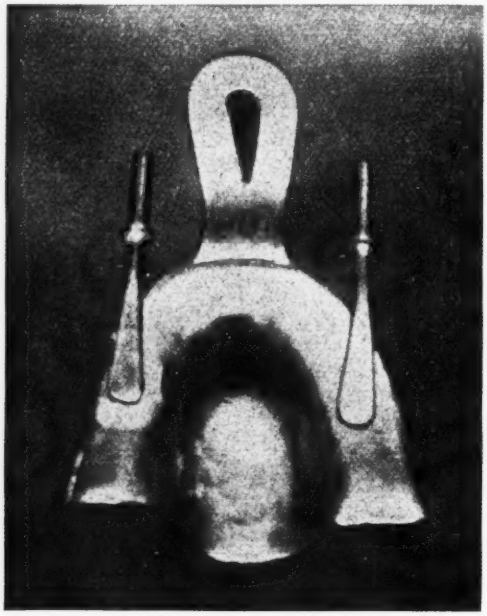

Fig. 2.

and nasal regions after having accurately estimated all the required measurements; the posterior part of the bow is first removed and then the facebow, after which both of these are carefully laid aside. The upper impression tray is now removed from the mouth and the lower impression is then taken. On the lower tray I have soldered two small tubes on which a chin cap slides. (Plate I, Fig. 2). After the impression gets hard in the mouth, the impression mass, with the chin cap embedded in it, is placed on the lower tray with the help of the guide pegs and affixed with two screws, while two more individual movable screws determine the points of the angle of the mandible (gonion). After the impression hardens, the chin cap and lower impression are removed. In this way I have obtained a plaster case of the chin, also additional important points of measurements, the gnathion and gonion.

The upper impression is now poured so it will not be too high but have a broad base which will reach the tragus point and be (the gnathostat model)

ready for use. This consists of a plane polishing foot plate, 2.5 mm. thick and has a joint anteriorly. In this point three movements take place. (Plate I, Fig. 3, and text Fig. 1.)

1. Up and down, support screw *A*.
2. Movement in the frontal axis. Frontal screw *B*.
3. Movement on the sagittal axis. Sagittal screw *C*.

Posterior to the foot plate is a perpendicular beam on which a second smaller plate slides, the head plate by means of a casing, and which is parallel to the first. The head plate can be lengthened anteriorly by a bolt, which is necessary for sketching the nasion points (Plate I, Figs. 3 and 4). Further essential parts are:

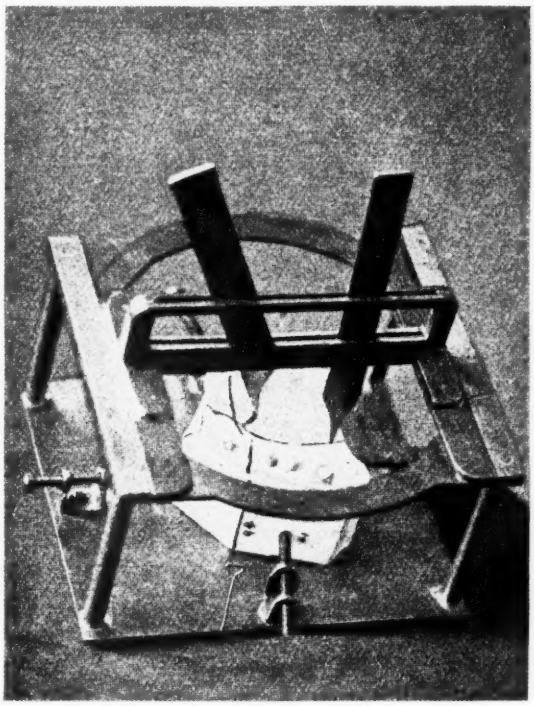

Fig. 3.

4. Set screw *A* (Text Fig. 1, and Plate I, Fig. 3).
5. The micrometer screw with an angle device for sensitive setting and for firmly holding the impression trays. (Plate I, Figs. 3 and 4, and Fig. 5, in the back.)
6. The horizontal needle which can be placed on the vertical beam to measure the cast.

The upper impression tray, with the impression in it, is now poured with a broad base and before it is fully set, with the free hand, it is inserted on the facebow and then adjusted to reach the tragus points, orbital and nasion points, after which it is trimmed according to these five points. Now the facebow, with the upper impression on it, is placed on the articular part of the gnathostat, the head plate is fastened at a desirable distance by means of the set screw, and then the orbital and tragus screws are set on the lower margin

of the head plate. The courser setting is furnished by the anterior point, while the more sensitive is set posteriorly by the micrometer screw which unlocks simultaneously at every play of the impression tray. (Plate I, Fig. 3, Plate I, Fig. 4.) As the horizontal screw does not reach the head plate in all cases we use an indicator which is set on the head plate and can be soldered directly to the tip of the screw. After this the head plate is again removed, carried on to the roughened upper surface of the upper plaster cast and pressed down as far as the set screw, then after the plaster hardens it is taken off. As the four screw points for estimating the ear-eye plane are cast in plaster the measurements can be acquired with certainty (Plate I, Fig. 5). In these asymmetrical positions an orbital point is used only for the placing of the left orbital point similar to anthropologic proceedings. The distance of the right orbital point, which often is at a higher level from the ear-eye plane,

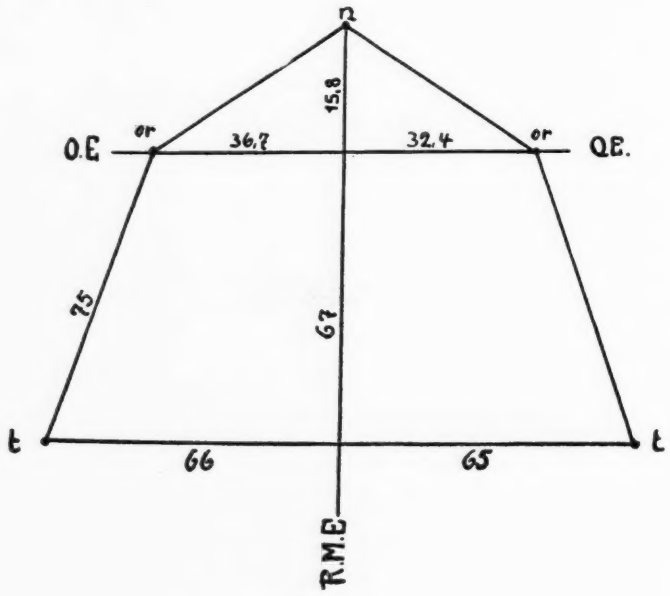

Fig. 4.

is measured and marked. On the upper surface of the casts I connect the two orbital points by drawing a line and also join the two tragus points in this way. I obtain the bitragial, bipolar or biauricular distances. Furthermore, I draw a line from the tragus points to the orbital points and later from these to the nasion points. All the points can be accurately measured with a ruler or still better with a compass. Then with the help of a graduated precision contra-angle, which I rest on the nasion screw, I transcribe the nasion points onto the upper surface of the case and note simultaneously the vertical distance from the ear-eye plane, which corresponds accurately with the upper surface of my casts. (Plate I, Fig. 5.) In like manner the ear height, which is the vertical distance of the bregma from the ear-eye plane, is measured in order to estimate the height of the head and the height of the opisthocranium. The rectilinear distance from the nasion to the opisthocranium shows the length of the head. Now the impression is removed from the gnathostat, the tray and

impression mass are pulled out and placed in the stereoscope. The new cast designed by Simon, and represented with some modifications, is best suited for this. (Plate I, Fig. 6.) For measuring, Van Loon's method is very serviceable as it possesses a shifting runner (Fig. 3). The raphe is accurately placed by means of the point indicator and is drawn across the entire cast, the same is done with the orbital line. The measuring is now complete as the distances from the orbital and tragus points to the raphe-median-plane have been produced. The scheme is shown on paper by tracing in Fig. 4.

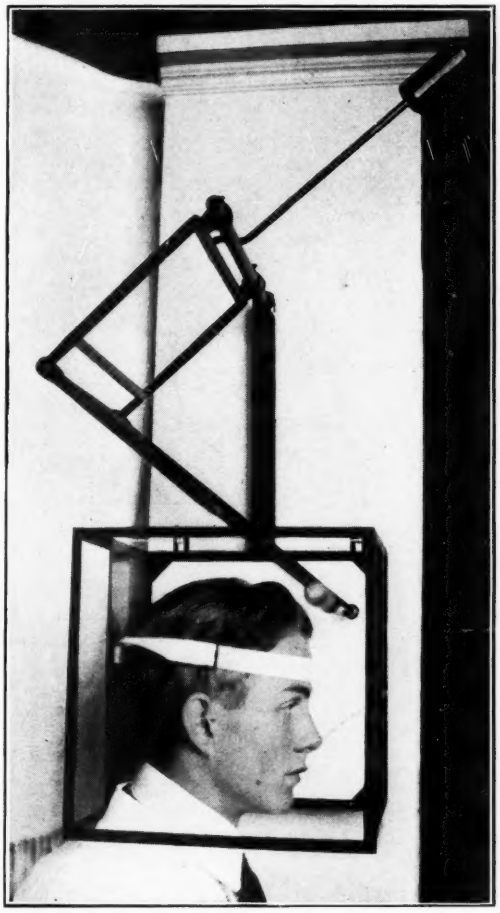

Fig. 5.

The upper model is trimmed to the accustomed size as it is not practical to leave it so large. The lower impression is also poured, placed on the chin cap and, with the free hand, the plaster is spread sufficiently to fill the chin cap, until the gonion screw becomes embedded in the plaster. The chin cap and impression tray are removed after the plaster hardens and the upper and lower casts are now brought into correct occlusion (upper cast underneath), and the raphe-median and orbital lines are drawn on the lower cast in the symmetroscope. The casts are then placed in a similar position on a sheet of tracing paper and then these are all set on the foot plate of the gnathostat or some other plate plane, (straightening plane) on this paper while the raphe-

median and orbital lines are drawn corresponding to the upper cast. With a paralleling device or a horizontal needle and the help of a precision contra-angle, the gonion is designed on the horizontal plane and its distance from the ear-eye plane drawn corresponding to the orbital distance from the plate. In this way we obtain all the measurements for the drawing of the mandible.

The lower cast is likewise trimmed and then with the upper in correct occlusion (upper cast underneath), they are placed in the gnathostat. In order to obtain the correct occlusion, which is not very easy at all times, it is advisable to take a wax bite. The lower plaster cast is transferred on the under surface and the head plate pressed down. In this way the base of the lower cast cor-

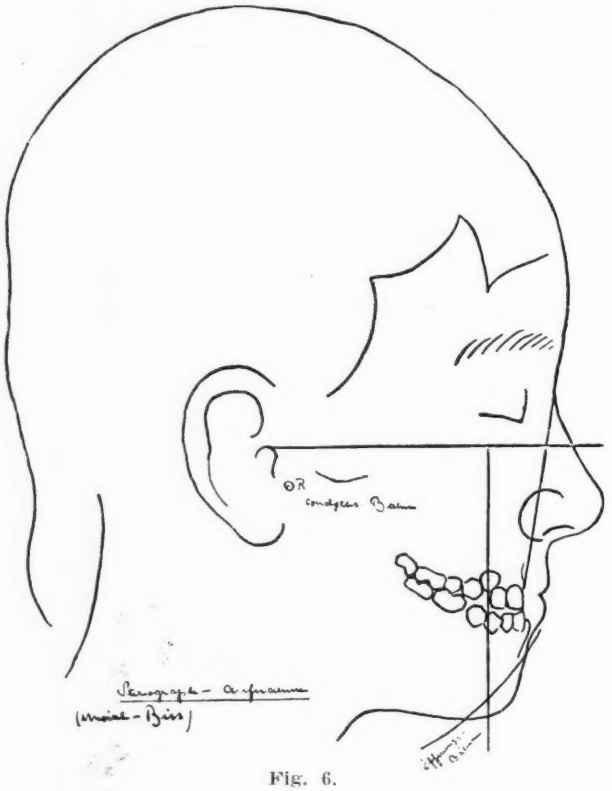

Fig. 6.

responding to the lower margin of the chin, is made parallel to the ear-eye plane.

To map out the acquired measurements and their eventual correlation to the jaw and teeth, I use the geometric drawing which allows an accurate measuring of the dimensions. As to the question of obtaining the position of the first maxillary molar and the inclination of the occlusal plane to the ear-eye plane, I first use Broca's stereograph, as it is in combination with the cubus craniophorus, instead of the foot plate and thus it is possible to get a sketching directly from the patient. (Fig. 5.)

To the posterior wall of the cubus is screwed a drawing board which is overtopped by a cross-beamed metal stand. On it is hung a drawing apparatus which moves on a hinge and is guided by a counter-balance. The under side of the frame is open. On its under end the same perpendicular side arm

carries a casing placed at right angles to it in which a lead pencil and crayon respectively can be introduced. Thus these pencils lie in one plane and are placed perpendicular to the surface of the drawing boards so that every position of the crayon is marked on the sheet suspended on the drawing board by means of the lead pencil. Then with the stereograph it is possible to draw not only an outline but also to map out the orbital points, ear points, (tragi)

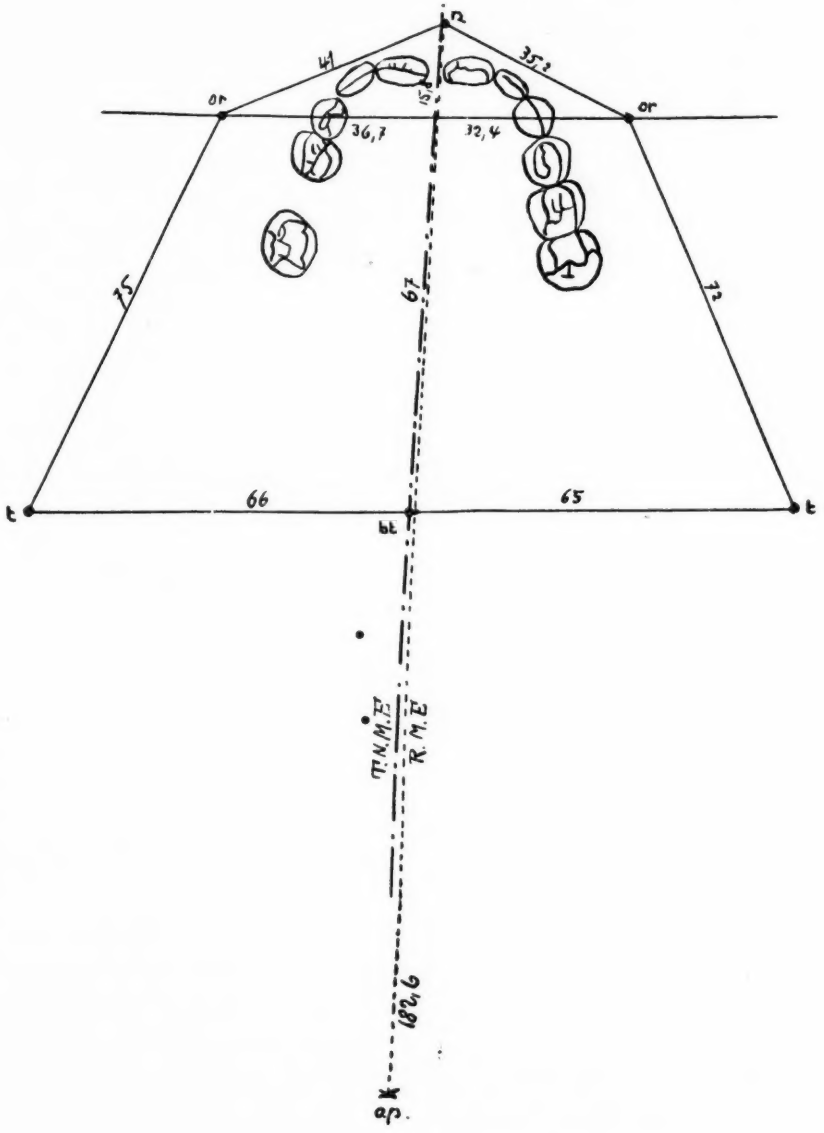

Fig. 7.

and occlusal plane, as well as the position of each particular tooth (I have constructed a separate steel pencil for this which is introduced into the vestibulam ones), and profile line, etc. (Fig. 6.)

I have abandoned this method of sketching which can only be used for skillful drawing and now obtain an orthogonal projection of the jaws and the important head points on the median sagittal plane, and horizontal plane in

another way. I have completely reconstructed Broca's stereograph which is thick and awkward. The cross beam pedestal, which is one-sided and thus somewhat awkward, is built with two arms, a firm frame of angle knee which touches the cubus and is fastened with four screws. To escape the disturbance which a counter-balance causes in drawing, the stereograph is screwed on sidewards on the cubus and in like manner the drawing board is fastened to the bottom. In this way we attain an extremely easy guiding of the crayon. This new drawing apparatus can be used for drawing skulls as well as plaster casts. (Plate II, Figs. 2, 3 and 4, and Plate III.)

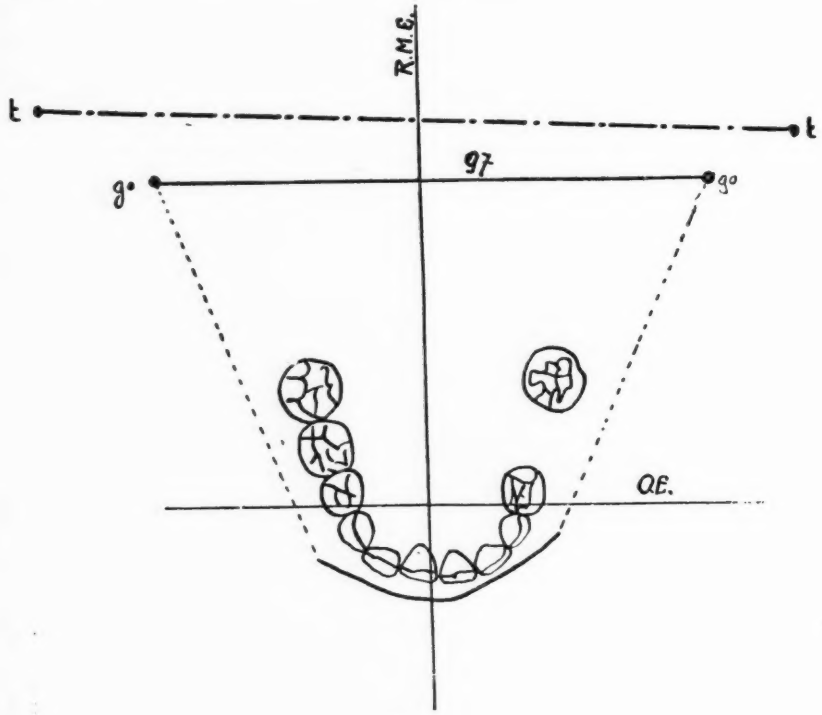

Fig. 8.

I. SKULL SKETCHINGS

With the help of a flange (Plate II, Fig. 2), a skull supporter is encased in the cubus, in which each skull is inserted in the ear-eye plane according to the Mollinson principle. When adjusting the skull supporter, both the squared bars above are moved into the external auditory meatus, that is in the portio, and then below the squared bars rest on the deepest point of the orbit (orbitalia). (Plate II, Fig. 2 and Plate III). To prevent a tipping of the skulls a wire is pressed onto the upper margin of the orbit and affixed with a screw and a second wire is placed on the crown of the skull by means of a flange. (Plate II, Fig. 2 above.) By this change the skull can be placed in all positions through inserting a three-cornered bar and torsion in the flange. If a skull, for example, is placed in a lateral position, not only can we sketch the outline and all the details of the surface of the skull, sutures, dental relations, etc., but with the crayon bent at right angles we can obtain the palatal height, inclination of the clivus foramen magnum as well as the form of the

glenoid fossa, and articular tubercle on the sagittal plane (Plate II). Then again by reproducing from the craniogram according to Paul F. Sarasin's system, the new stereograph can be used instead of the diagraph in which the crayon can be fastened by a set screw at any desired height (Table III). It is especially important for us to sketch the dental arch and dental curve with an accurate position on the ear-eye plane and this can be automatically obtained with the new stereograph, and without any help from the horizontal needle. (Plate II, Fig. 3 and Plate III.)

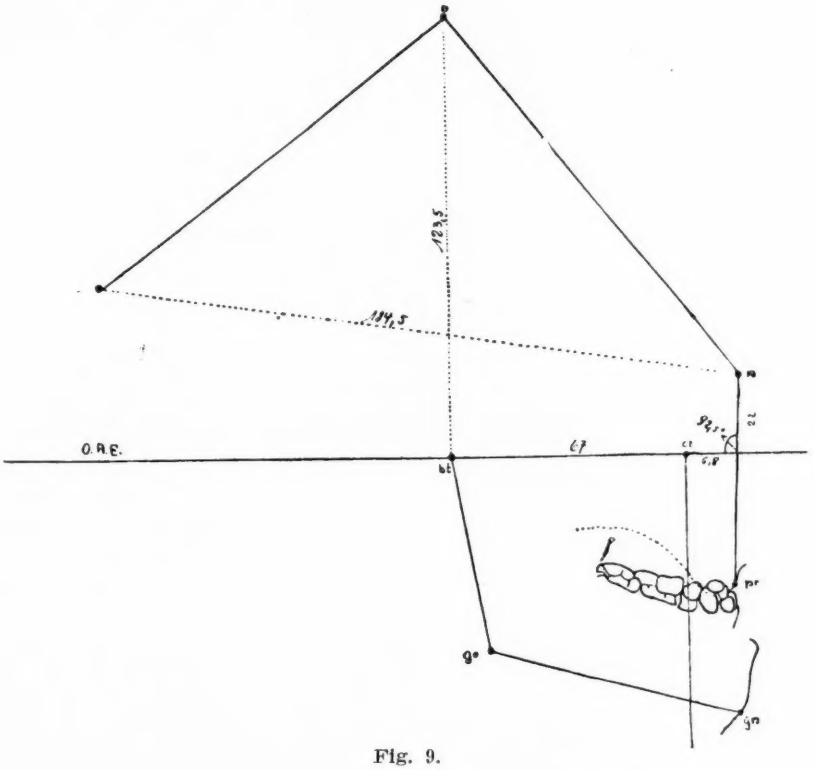

Fig. 9.

II. MODEL SKETCHING

To draw on the gnathostat cast, the skull is supplemented by a right-angle metal plate, the base being set accurately parallel to the drawing board through the help of the crayon. The maxillary gnathostat cast, whose base corresponds to the ear-eye plane, is screwed firmly to the plate. By means of the straight crayon, the alveolar arch, teeth and their details can be so accurately traced that the resulting picture is geometrically and scientifically accurate. (Plate II, Fig. 4.) The raphe-median lines and orbital lines are also sketched. The mandibular cast is reproduced in like manner on the horizontal plane is obtained. To carry the designed picture on to the sagittal plane the plate, to which the upper cast is screwed, is turned about 90°, while the raphe is set parallel to the drawing board by means of the straight pencil and now the one side of the maxillary cast is sketched on the paper at the same time that the palatal line is drawn. The mandibular cast is then placed in correct occlusion to the maxillary, screwed on and sketched. The ear-eye plane and

orbital line are accurately marked. The other side can be sketched in the same manner. By this method I obtain the three most important graphic maps of each case.

1. Design of the maxillary cast on the horizontal plane. (Fig. 7.)
2. Design of the mandibular cast on the horizontal plane. (Fig. 8.)

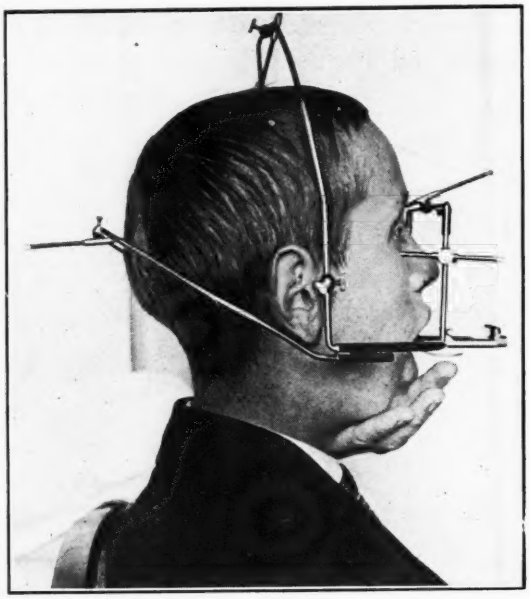

Plate I, Fig. 1.—Facebow to determine the ear-eye plane and the most important cephalometric points—nasion, bregma, opisthocranium.

Plate I, Fig. 2.—Impression of mandible with chin cap and gonion screw.

3. Design of right and left halves, respectively of the maxillary and mandibular casts on the sagittal plane. (Fig. 9.)

By means of the new facebow the measurements obtained can be transcribed into accurate figures, as these particular distances are marked. In Fig. 7 we see: Sketch of the nasion point (*n*), orbital points (*or*), and tragus points (*t*). The last are connected by a line and thus we obtain the bitragial, bipolar, or biauricular distance (*t-t*) which corresponds with the width of the head. (Martin p. 5.) Furthermore, I draw lines from the tragus points to the orbital points and from the orbital points to the crossing point of the

raphe-median plane with the frontonasal plane. Now I drop a vertical line from the nasion point to the bitragial line so that I have the median plane of the head. (T. N. M. P.) The raphe (R. M. P.) has already been drawn across it, so by means of it, I obtain a picture of the variation in these two lines.

In Fig. 8 (mandible), the raphe-median line, orbital lines and chin curve are sketched in the height of the greatest size, it supplies the gonia (mandibular angle points *go*). Its connecting line shows the width of the angle of the mandible (width of the lower part of the face). It shows the measurement of the projected distance of the gonia from the gnathion, on the horizontal plane.

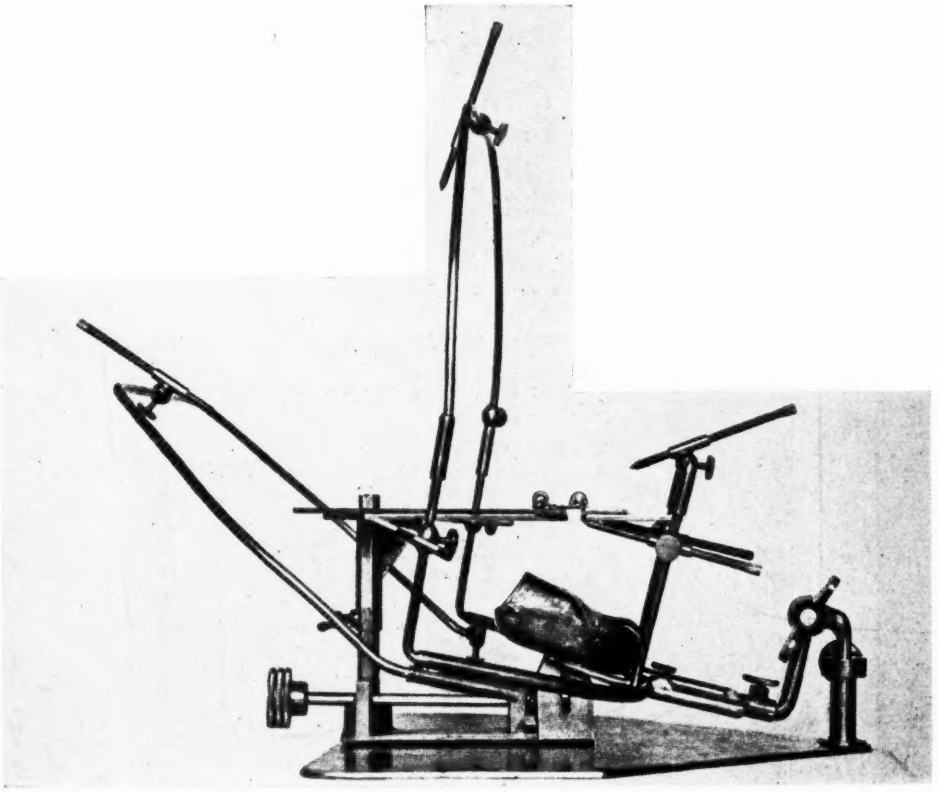

Plate I, Fig. 3.—Gnathostat with facebow in position.

In Fig. 9 (the sketch of a side view of both casts on the sagittal plane) the horizontal distance of the nasion points from the orbital line and their vertical distance from the ear-eye plane is traced. In this way, I have not only measured the nasion point but also the vertical (Tryfus,[13] Dreyfus[1] and horizontal nasion plane, Van Loon,[15]) in its relationship to the ear-eye plane. The last horizontal segment which this reaches, from the nasion to the infraorbital margin, is drawn as the region of the eyes in anthropology. (F. Sarasin.[9])

On the bitragial point, the perpendicular distance of the ear height is erected which corresponds with the projected distances of these points (*bt*) from the bregma (*b*), and forms an important measurement of the height of the head. (Martin, p. 15.) The opisthocranium (*op*) is now traced and connected with the nasion point (*n*). This corresponds with the length of the head (Mar-

tin, 1d). The prosthion-nasion (*pr-n*) line is the same as the morphologic height of the upper part of the face. (Martin, p. 20.) The rectilinear distance between the nasion (*n*) and the gnathion (*gn*) is the same as the height of the face. (Martin, p. 18.) The angle formed by the ear-eye horizontal, a nasion (*a*) and prosthion (*pr*) being connected, corresponds with the angle of the upper part of the face or profile angle (Martin, p. 42). This is measured and

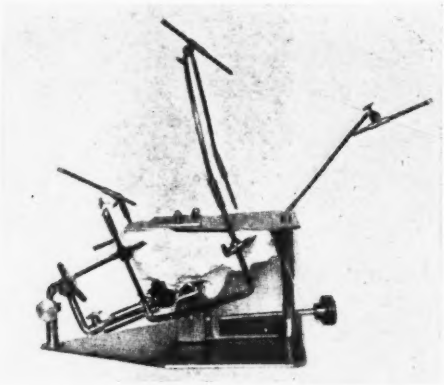

Plate I, Fig. 4.—Upper impression poured, head plate set upon it.

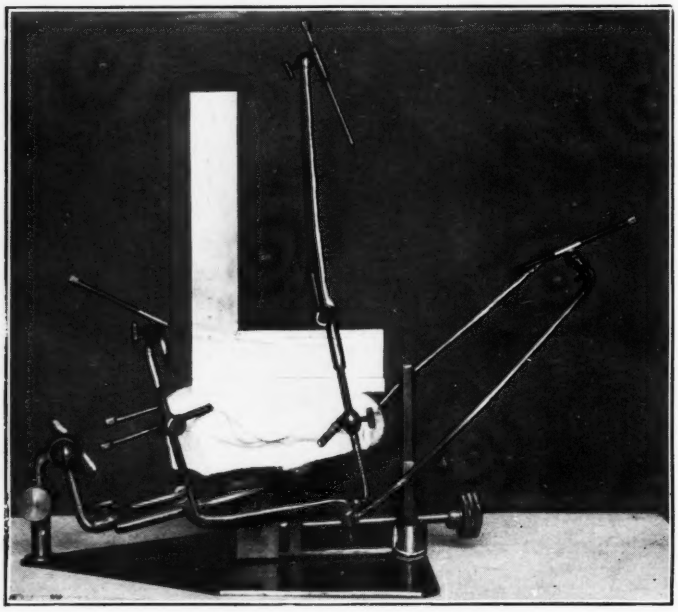

Plate I, Fig. 5.—Head plate lifted. Precision contra-angle placed on the upper surface of the cast to measure the head points.

marked. By connecting the bitragial points with the gonion and gonion with gnathion, we obtain a clue to the angle of the mandible.

With my stereograph, the diagram of the palate can be sketched directly by means of the straight crayon. The curve on the raphe-median plane is represented in Fig. 9. It can be transferred to its parallel plane sideways if desired. In a similar manner, we obtain the transverse palatal curve by extending the perpendicular to the median-sagittal plane. A series of such curves can

give us a clue to the development of the palatal vault. The perpendicular distance of the biting edge or tubercle of a particular tooth from the ear-eye plane can be read off and marked in the drawing. The angle which is formed by the alveolar and occlusal planes with the ear-eye plane is also measured. In Fig. 9 we obtain a clue to the inclinations of the axis of each particular tooth toward the orbital plane and in Fig. 7 and Fig. 8, we obtain the inclination toward the median plane. In Figs. 7 and 8 a linguoversion of the teeth can be recognized by the enlarged appearance of the buccal surface, and a labioversion is recognized by the enlarged appearance of the lingual surface; if Fig. 7 (upper jaw), is placed over Fig. 8 (mandible), by correctly surveying the right and left sides through the help of the ear-eye and orbital lines, the dental arch can be traced from Fig. 8, to Fig. 7, and so we obtain an accurate reproduction of the occlusion on the horizontal plane. In order to represent such a picture of occlusion,

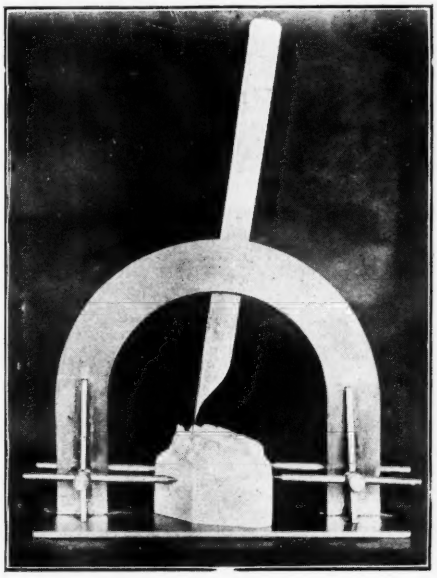

Plate I, Fig. 6.

Stanton[12] and Hourtiguet,[4] have recently recommended a very complicated apparatus. However, this can be done in a very simple manner by means of the stereograph. A diagram of the entire occlusal curve which passes through the bucco-occlusal measuring point of each tooth according to the Abscissa and ordinate system, which Simon designates as being especially important, can be produced as the vertical distance of a particular measuring point can be transcribed from Fig. 9, while the true width measurement can be obtained from Figs. 7 and 8.

In Figs. 7 and 8, the measuring points according to Pont (anterior fissure of the occlusal surface of the first molar and the distal end point of the fissure of the first premolar of the maxilla) can be marked and these distances can be compared with the figures of the Pontic Index. The diagram, which is for skulls as well as for the gnathostat casts, is so complete that it leaves nothing to be desired. Measuring the design with a compass afterward shows that the

drawing is accurate to within one-tenth of 1 mm. Until now the cephalograph was known as a sketching apparatus. (Hat makers' apparatus). The best cephalographs are Landau's and Holl's[6] (1913); Ruppe's[7] gnathometer was constructed according to this system. For making geometric drawings of large objects, Rudolph Martin's Dioptrograph is recommended and is an improvement in construction of the so-called Lucaesean drawing tables. Franke's[13] Dioptrograph is simpler. For an outline drawing in a definite plane, the Diagraph (Periograph) is indicated. The new stereograph, however, surpasses all these apparatuses because of its many-sided possibilities of application.

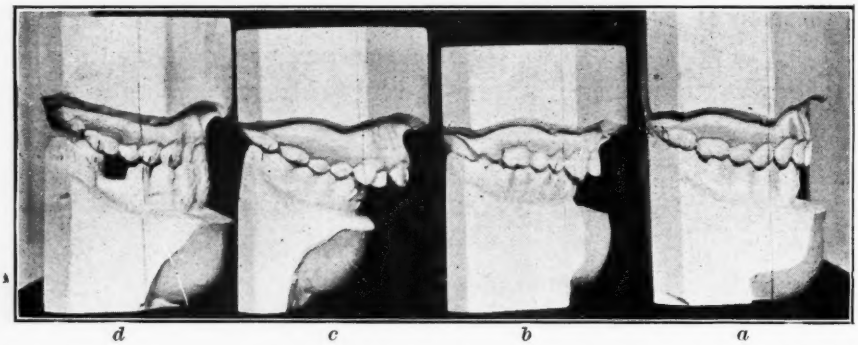

Plate II, Fig. 1.—Gnathostat cast *A*, Neutral bite Angle Class I, *b*, *c*, distal occlusion, Angle Class II, *d*, mesial occlusion, Angle Class III. The figure shows the different vertical distances of the alveolar plane and occlusal plane from the ear-eye plane, various constructed chins, *b*, *c*, in distal occlusion for example.

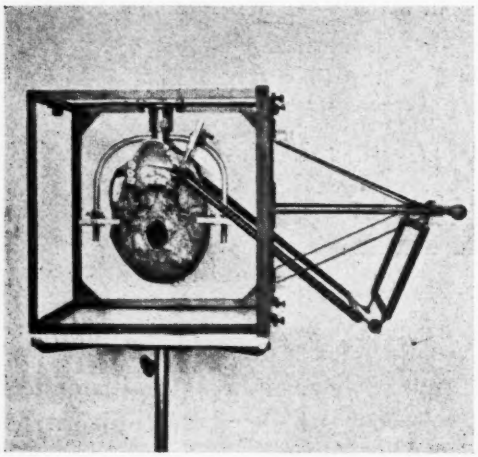

Plate II, Fig. 2.—Stereograph fastened sidewards on cubus craniophorus, the cubus is balanced to show the construction of the stereograph. The craniophor is in the cubus for the installation of the skull in the ear-eye plane on a revolving flange.

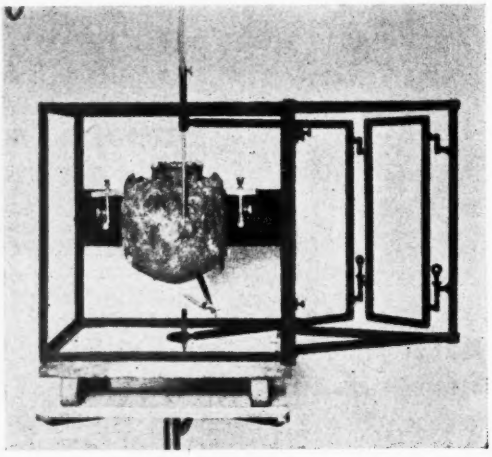

Plate II, Fig. 3.—Skull drawing of Norma Basilaris, the drawing board is screwed on to the under side of the cubus.

THE SIGNIFICANCE OF PHOTOGRAPHIC REPRODUCTION

Photographs offer us another means of reproduction. This, in contrast to the orthogonal, gives us a perspective view which is seen distinctly in Plate II, Fig. 5. The anterior part of the margin of the cubus appears of greater prominence than the posterior although they are both the same size. Despite this fault, a photograph is indispensable for a study of facial outline in orthodontia,

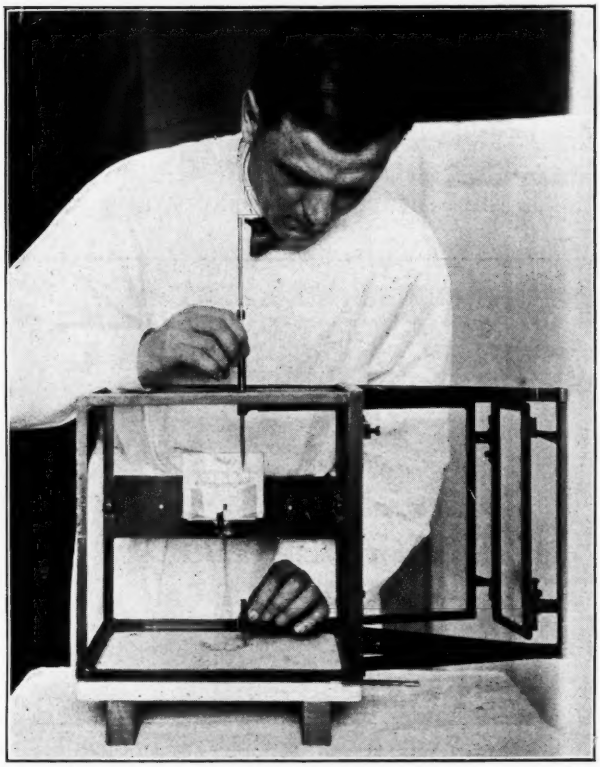

Plate II, Fig. 4.

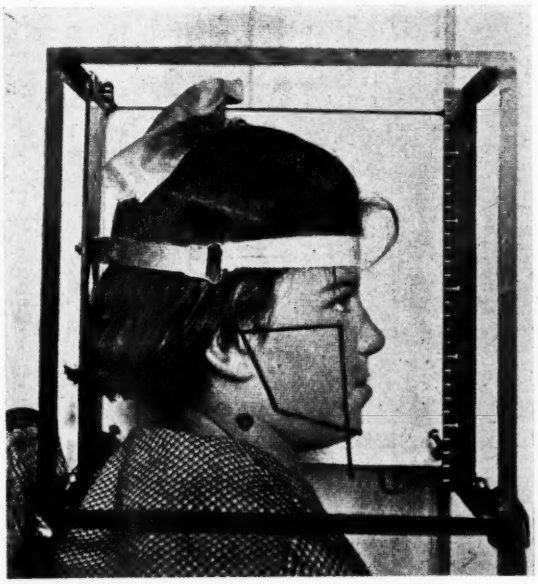

Plate II, Fig. 5.—Drawing the dental arch of the gnathostat cast. (Superior Maxilla.)

and as a record for the patient; I do not use it for measurement purposes, as the teeth cannot be seen and so we cannot determine whether the teeth are in their usual occlusion during the time the picture is taken. My new method of geometric drawing furnishes not only a correct metric and graphic sketching

of the head points alone, but also of the jaws and teeth and thus in this way forms a valuable supplement to the x-ray. For the photostatic (Simon) I use the "cubus craniophorus," then I provide the drawing board with a hanging device so that it can be tipped over the head of the patient without disturbing him. In the cubus, a headrest is fitted up for the purpose of having the head held securely in it. On the flat surface of the apparatus which is placed parallel

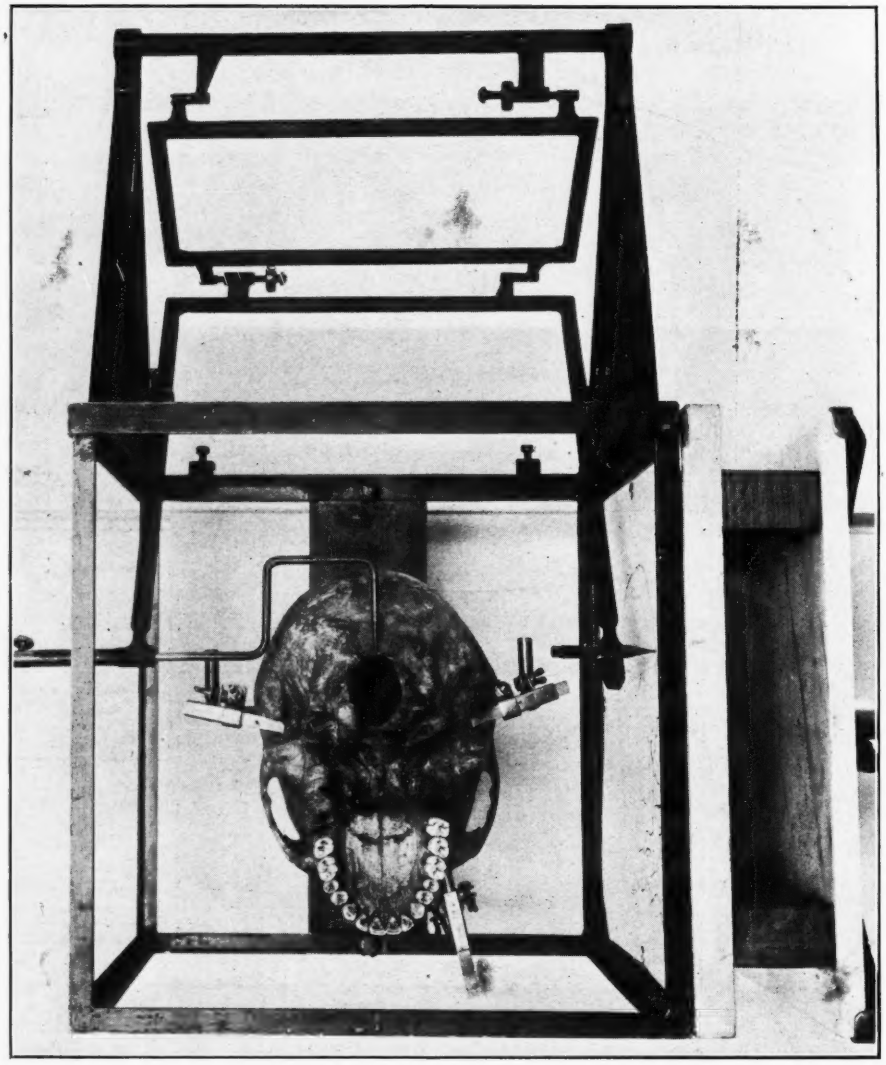

Plate III, Fig. 1.—Skull drawing in Norma Lateralis; the median plane of the skull is set parallel to the drawing board with the aid of a crayon bent at right angles.

to the cubus, a circle is drawn which can be set on the ear-eye and orbital lines of the person to be photographed. By figuring according to a string placed at the center of the cubus, it becomes possible for me to obtain a definite profile setting of the head. On the height of the median plane a ruler is placed with which we can determine on the picture the depreciation and approximate distortion, and which can also be used for adjusting purposes. The ear-eye line and orbital line are then engraved on the finished proofs with a fine instrument.

OLD AND NEW METHODS OF MEASURING THE JAWS

The problem of measuring as well as representing the jaws and dental arches in a drawing has always attracted the attention of scholars. In 1780, J. Hunter was already able to present correct statements about the development of the jaws and had many other authors as his followers. For the first time in forty years, O. Zsigmondy drew a comparison between the measurements by taking plaster impressions of both the deciduous and permanent teeth of the same individual. Franke,[3] submitted a very important piece of work in 1921. In his book he not only reviewed all the old results of measuring but also presented much of his own material, and also brought out many numerical tables that are important for orthodontia. In 1914, Van Loon unraveled the important problem of measuring the jaw for orthodontia. His followers were: P. W. Simon, Berlin,[11] Paul Wustrow,[18] Erlangen, Ruppe,[7] Georges Villain, Paris,[17] S. Dreyfus, Lausanne,[1] Fritz Tryfus, Heidelberg,[13] Stanton, America,[12] and others. For the most part these works dealt with the diagnostic problem in orthodontia which recently caused a dispute about the orbital line. Hardly any figures were submitted.

The aim of the foregoing work is to gather anthropologic numerical data of all facial measurements and build upon it. The dentist and orthodontist find themselves in an advantageous position because with the help of the new measuring apparatus, they can take measurements of the same individual at definite periods of time and thus, by considering the important cephalometric points, can obtain a positive key to the complicated development of the face, jaws and in fact the entire head. Such examination has been made in part on the skull until now. There are also separate tables of head measurements that have been thought out for us, these are the result of research work by Rose and Schwarz. My own results along the line of measurements are submitted in Part II. (To be published in November issue.)

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GROWTH DISTURBANCES IN CHILDREN FROM VIEWPOINT OF DISTURBED ENDOCRINE GLANDS*

By R. B. Wood, M.D., Knoxville, Tenn.

THE practice of medicine and dentistry alike was once the application of remedial agents for the relief of present discomfort or an effort to reestablish normal organic conditions. This devolved itself into a treatment of symptoms and abnormal findings and was the result of a lack of knowledge regarding physiology of both normal and pathologic types. Following the time represented by the above state, there were successively passed through the eras of bacteriology, chemistry, surgery, serology, etc. Such has been the progress down the ages that now, if we are abreast of the profession we represent, we must have working knowledge of many sciences closely allied to our studies. No longer should we be a reliever of symptoms alone, but as true practitioners we should investigate the causes of abnormalities and seek to establish a normal regime. Furthermore, we should not limit our efforts to the recognition of organic changes, but the physiologic as well. For it is the writer's opinion that we are now in the dawn of another revolutionary change in the medical world and which will advance hand in hand with dentistry and nursing. I refer to the development of means for the recognition of altered function or functional pathology.

To you as dentists, of paramount interest are those factors at work that tear down the vitality of your patients, and those conditions that prevent proper growth and development of the younger generation. We are all interested in the development of children, and dentists as well as the general practitioners of medicine should be sufficiently alert to recognize abnormalities of growth early enough to institute proper remedial agents. While any abnormality cannot be defined by any clear-cut line of demarcation, yet there are such departures from our pliable standards that it is not difficult to recognize them as belonging to a pathologic group. Before entering a study of abnormal growth let us review for a moment those factors that promote normal development. First of all we must possess a sufficiently virile organism from our progenitors to enable us to combat successfully against the destructive forces of Nature. The value of an untainted heredity is seldom appreciated in the discussion of many physical and mental deformities. Not only do you frequently see the harelip and cleft palate in successive generations, but also do we find abnormal endocrine conditions.

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We are taught to believe there are certain growth tendencies latent in the fertilized ovum sufficient to stimulate progress for many months without extraneous factors. Also, we must consider the innate tendency of a species to approach a normal standard. Regardless of the tissue, there are laid down for its growth certain laws to which it must conform and these conditions are fulfilled provided all factors influencing it extraneously are also normal. Among extraneous factors which are just as vital to the end-result are food, exercise and sunlight. These, however, are outside the subject of this paper.

In regard to development of our knowledge concerning growth and other body functions, we owe most to the physiologists, but they have only recently come to recognize that body functions are controlled by chemical as well as by nerve force. Since that discovery much work has been done toward the detection, recognition and action of this chemical force, which seems to be a product of certain internal organs, and which has been termed hormones. These hormones are difficult of solution, because the gland manufacturing the product possesses no excretory duct. Attempt has been made to collect the supposed secretion from the blood after it passes through the gland but this has been successful only in the case of the adrenals. That these glands do play a vital part in metabolism has been demonstrated by animal experimentation and also clinically. The chief ones as regards growth and metabolism only will be mentioned in this paper, such as the thyroid, pituitary, gonads, adrenals and pineals. They are all closely allied, and altered activity on the part of one may be accompanied by changes in another. Further, the endocrine chain of glands is intimately connected with the vegetative nervous system both embryologically and physiologically, for we note that all chromaffin tissue is from neuroectodermal origin as is the post lobe of hypophysis. The physiologic relation can be demonstrated by noting similarity of action between stimulation of the sympathetic nerves supplying the glands and the administration of the gland substances.

It is difficult in a limited paper to discuss the different problems that confront you as dentists without going into intricate problems of endocrinology, much of which is yet in the experimental and even theoretical stage; so the writer will attempt to discuss only that part as relates to the development of the body, bones and teeth of the child and maintenance of normal nutrition.

Chief among the glands affecting growth are the thyroid, pituitary and gonads. Accurate description of the result from a loss of either is difficult because each is intimately connected with the other, and believed by some to be inactivators of each other. For instance castration of the young animal leads to an overgrowth and a hypersecretion of the pituitary.[1] Temporary enlargement of thyroid and pituitary glands is noted during menstruation and pregnancy.[2]

The gland about which most has been discovered is the thyroid, which regulates metabolism and assists in governing bone production and growth. In animals, and even at a time before its importance was known, its removal in children produce constantly a certain train of symptoms, such as delayed growth, especially affecting the long bones, thickening and roughing of skin,

atrophy of nails, loss of hair, gaseous distention of the abdomen, etc. Today, of course, we rarely see such extreme cases in children or adults, but we look for signs along similar lines. The mother brings the child in because he is not growing properly, or because he has some minor complaint as indigestion, or in case of a girl about puberty because of a growth on her neck. Then we note in the child's history frequently an overweight at birth, a delay of the usual age of walking, talking and dentition. Extreme cases present an apathy for the usual sports of childhood, he is dull, progresses slowly in school, has faulty digestion and is probably overweight.

On examination we note a dullness of expression, perhaps a superabundance of fat that is distributed fairly equally over the entire body. The hair is dry and coarse, the eyebrows are likely thin at the outer border, the eyes seem to appear between two slits in extreme cases, or it may appear as though there were edema of the tissues beneath the eyes. The tongue may be thickned, the thyroid may or may not be enlarged. The abdomen is prominent and distended with gas. The basal metabolism is always low. X-ray of hands or feet will in the young show late development of bone nuclei.[4]

As to the dental features of a hypothyroid case we note the delayed dentition in early cases. Oppenheim reports a case with no teeth at twenty-two months. Cases later developing show a persistence of the decidual teeth and changes in the permanent teeth. Cretins show anomalies of the jaw, retarded teething as well as anomalies of position of the teeth, and defects in the enamel.[3]

The second gland so intimately connecetd with growth disturbances is the pituitary gland consisting of three distinct portions, an anterior, posterior and pars intermedia. Full and accurate knowledge concerning pathology of this gland has not been determined, but certain definite growth abnormalities are constantly associated with its disturbances. The anterior portion of this gland presides over bone production, both the long bones and those about the face. For instance we know that a hypersecretion of this gland in the growing child accelerates the growth of the long bones and this continues as long as the epiphyseal junctions have not closed. If continued activity is maintained it leads to the production of a person with giant-like proportions. If the hyperactivity begins in the adult there results the acromegalia, the person with the large hands and feet, the protruding maxilla, the large head with prominent forehead.

Of more interest is the hypopituitary child whose history is quite unlike that of the hypothyroid. These children have normal birth weights as a rule and progress normally until the age of 4 to 6 years. Their walking, talking and dentition is normal and their intelligence is perhaps above the average up to the time of marked inactivity. Two important diagnostic points in regard to a deficiency of this gland are unfortunately debatable, namely obesity and the condition of the genitalia. The obesity is ascribed by some to deficient secretion of the posterior lobe while others place it as due to changes outside the gland at the base of the brain. Many cases of pituitary overweight are associated with tumors of the gland and pressure effects must be taken into consideration. However, we do see cases fulfilling the

picture of the pituitary syndrome that have no symptoms of pressure. The obesity of pituitary origin has a characteristic distribution about the shoulder and pelvic girdle, about the mammary and over the mons.[4]

In regard to the genital condition there is noted a lack of development, the penis being extremely short and often almost hidden by the overhanging layer of fat. The testicles are small and often undescended. One also frequently notes a patient with polyuria, voiding large quantities of urine with low specific gravity. This type of patient may or may not be overweight and does not necessarily present any variation from the normal measurements. Many are underweight and yet many ascribe the condition known as diabetes insipidus to a deficiency of the posterior lobe. The supposition is apparently correct, for the administration of pituitary extract, will ameliorate or cure the condition in most instances.

As to the osseous development of the hypopituitary it is manifiested by a stunted growth of the long bones. The epiphyseal junctions remain open for a longer length of time than normal but there is absent the normal harmones for bone growth.[5] There also develops in the male individuals a contour of body resembling the female sex. The hands present the tapering fingers and are of the narrow type. The pelvis appears broad, perhaps due to the deposition of fat about the girdle and over the trochanters, due to gonadal insufficiency the fat about the breasts is abundant; there is a distribution of hair in the adult over the pubis resembling the female type. The voice does not assume the deep male tone. The sex glands perhaps play an important rôle among the youth, but recognition of this condition has not been stressed in the literature. Their period of activity begins only at puberty when development is far along and this applies to the two functionating portions of the gland, namely the reproductive and the Leydig or interstitial portion. The latter portion is responsible for the secondary sex characteristics, as change in the voice in the male, the rapid development of sex organs, the characteristic hair development on face and pubis. In the female the ovaries are of course responsible for the soft voice, the absence of hair, the body contour, the facial characteristics; as has been well said, "A woman is a woman because of her ovaries."

Castration early in life of the female prevents the development of female characteristics and there is a tendency to assume male ones. Among the males cases of early castration are rare, but Tandler and Gross have described members of a religious sect among whom castration was practiced on certain unfortunates. These were described as possessing a small head, long disproportionate limbs and a lack of hair on the face and pubic region. Such defects can only be ascribed to a lack of Leydig cells and can be explained on the bases that these glands at the time of their usual active stage begin the closure of the epiphyseal junctures, but during their absence the closure does not take place and the active pituitary gland produces an increase of the long bones.

Among abnormal growths one readily calls to mind the frequently seen dwarf. There are at least two types of this class, those with proportionate development and those without. The last named is believed by some to be

due to a hyperactive sex gland, for we see the exact opposite to the eunuchoid group, namely a large head, short limbs, heavy beard, and great strength. The ossification of epiphyseal centers is early.

Of more interest to you as dentists are the parathyroid glands, because of their relation to calcium metabolism. This knowledge has been gained through animal experimentation and the study of tetany. A sufficient lack of calcium in the circulating blood leads to the production of tetany or a twitching and spasm of muscles, accompanied with increased excitability of nervous tissue. This condition is always seen accompanied by rickets, and can be produced experimentally at any time by removing a sufficient amount of calcium from the blood.[6] One naturally draws the conclusion that calcium can cure tetany and correctly so, for animals can be kept alive indefinitely by introducing soluble calcium salts into the blood stream or giving the drug by mouth after the parathyroids are removed. Transplantation of those glands has been successfully done.

Tetany from insufficiency of the parathyroid is associated with changes in the teeth and calcification of bones in general and the literature abound with reports of the softening and disintegration of teeth in animals under experimental study. Unfortunately we have no standardized preparation and no scientifically proved conditions that warrant administration of parathyroid extract with the hope of clinical cures.

The pineal gland will receive only slight mention in this article because of our present day lack of knowledge concerning this gland. The information concerning it has been gained through autopsy and animal experimentation. Tumors destroying the glandular structure result in early maturity and are found in children of 1 to 5 years; there is early development and growth of sex organs, with secondary sex characteristics forming the main features of the disease.

In regard to glandular therapy in endocrine disturbances our chief reliance is yet in thyroid extract. Pituitary feedings occasionally give fair results, but its efficiency by no means equals that of the thyroid. Unusual claims made by many enthusiasts and exploitation by pharmaceutical houses are partly responsible for the present day indifference of many medical men to endocrinology as a whole.

Endocrine disease is rare, but so are many other diseases, yet it holds a definite place in medical science.

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MALOCCLUSION OF THE TEETH REGARDED AS A PROBLEM IN CONNECTION WITH THE APICAL BASE*

By Axel F. Lundström, Stockholm, Sweden

(Continued from September.)

2. The Position of the Upper First Molar Explained From the Standpoint that Malocclusions of the Teeth are Problems in Connection with the Apical Base.

In his description of his Class II, Angle states that the very common view, that in cases belonging to this Class the upper jaw is overdeveloped, is not correct. As reasons for this he cites his own experience. He has never seen such a case. Case opposes this view, contrasting with it his own contrary experience. In a recently published work,[74] Angle's point of view is criticised by Simon. It is, says Simon, incorrect to assume a condition to be without exception merely because the reverse has not been observed. But besides this he criticises Angle for not having founded his opinion upon objective investigations carried out with the aid of cephalometric tests.

Simon considers that no foundation exists for the assumption that the position of the upper jaw is always normal in relation to the cranium. Evidence to the contrary he has not yet succeeded in producing, but were one able by cephalometric measurements to prove that, e.g., "in the European races the orbital plane on an average intersects the cusps of the cuspids, and the vertical axle of the cuspids lies in the orbital plane," this experience would rank as a law, and divergences appearing in the individual case would be judged in the light thereof. Now Angle has found that not only on an average, but as far as his experience goes, the upper jaw is not in a position too far forward. He has given this experience the standing of a law. This is, in Simon's view, incorrect. But none the less he considers that one is justified in making a law of experience on the question of the position of the cuspids in relation to the orbital plane, which can be gathered from his cephalometric investigations. What warrants the establishment of a law, therefore, is in this case the taking of certain measurements of as large as possible an amount of material of a particular character. But granted that in a reasonably large number of cases one has without exception proved the stated fact amongst the European races, it does not follow therefrom that the law holds good. Simon himself says: "Even from a purely logical point of view the fact of such cases not having been observed is no strong proof of their nonexistence. Every assumed piece of knowledge that has arisen out of experience may be altered, confirmed or disproved by fresh

*Reprinted from *Svensk Tandläkare Tidskrift*, 1923. References will be published at end of article in last installment.

experiences.'' This is quite true, but it follows from it that ''fresh experiences'' can prove that Angle's view of the position of the upper jaw was still relatively more accurate than Simon's assumption, until further experience controverts the fact.

In my opinion a question of this kind cannot be solved by statistical methods; for if all measured cases within a race proved that the cuspid lay in the orbital plane, it does not follow that if suddenly an exception from this rule be observed, such a case should, either from a hygienic, a functional or an aesthetic point of view, be a subject of treatment if, as we presume in accordance with Simon, it was a case of normal mastical occlusion. It is not to be disputed that an anomaly exists in that case. But that which ought to decide whether treatment should be given is not the actual divergence from the ''normal,'' but the subjective opinion (of the operator and the patient) as to whether a sufficient divergence is present to justify orthodontic or other interference with a view to altering the condition. There is no certainty that such a subjective opinion allows itself to be influenced by the result of cepha-

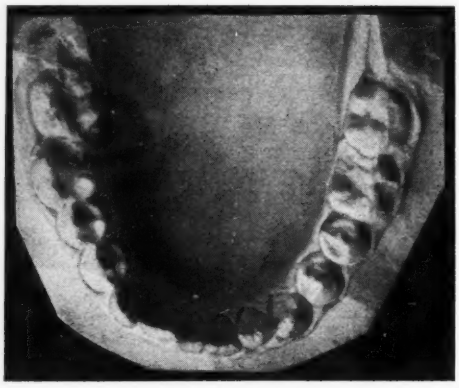


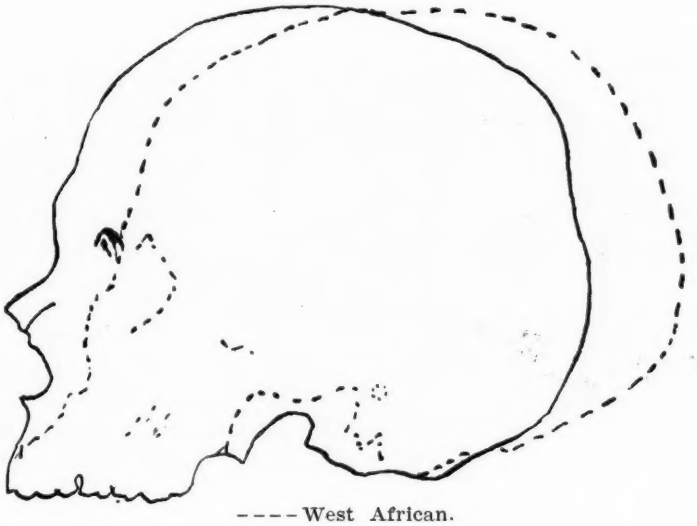
Fig. 54.

lometric investigations. The patient may be quite indifferent as to whether his normal mastical occlusion is so situated that the cuspid is in front of or behind the orbital plane.

Case's aesthetic instinct is shocked by a certain degree of protrusion or retrusion, and in accordance therewith he alters the position of the teeth. His treatment aims to attain a tangible object, something which he conceives to be a harmonious relation between the denture and the rest of the face. A harmonious relation is certainly something worth aiming at, and worth seeking to attain, provided the operator and the patient both conceive it as such. On the other hand, to succeed in bringing the teeth into a certain relation to the orbital plane is an aim worth striving for only to the extent to which it satisfies the requirements of the party concerned, which are not purely scientific. Now we are well aware that normal mastical occlusions in different races may stand in different relations to the orbital plane, and certainly people are to be found amongst our own countrymen with the position of the cuspid in front of or behind this plane. Ought now the denture of these persons to be regarded as anomalous and, therefore, requiring correction, or as ''fresh experiences,''

proving that the law regarding the prognathous position of the denture of the race is really no law at all?

If the relation of the apical curve to the coronal curve is correct, as it is in normal occlusion, the various racial types then show that the prognathous position as such is from a hygienic and a functional point of view equivalent to the orthognathous position. At least we are justified in assuming the probability of this assertion until the contrary has been proved to be the case. Any motive for altering it would, therefore, really be based only upon aesthetic or psychological reasons. Were these founded merely upon the results of cephalometric investigations—and we know that these can be overthrown by fresh experiences, we simply could not assume the responsibility in any given case of undertaking a correction on what is in its nature so unreliable a ground, but in every case it is the subjective opinion that is the deciding factor, in other words, we are no longer moving within the sphere of science, but are follow-



---- West African.

Fig. 55. (From Cryer.)

ing Case. And this is, nevertheless, considerably less harmful than to regard all the more important divergences in regard to the orbital plane as anomalies, and to correct them, even if they have been in no wise purely subjectively conceived by operator or patient as in any way objectionable until the degree of abnormality had been determined by measurement.

Angle, as already mentioned, considers that the upper jaw cannot be in too prognathic a position. No example proving the contrary has to my mind been produced so far. And what is more, it seems to me that no such proof can ever be offered in any case where the apical and coronal curves of the upper arch are in harmony with one another. Cryer[20] publishes an illustration of a profile of a West African skull (see his Fig. 321). The prognathism is extreme, and judging from such superficial measurements as can be taken from an illustration, the orbital plane appears approximately to intersect the longitudinal axis of the second upper premolar. Between this degree of prognathism and Simon's assumed normal there are all kinds of transitional degrees. How

is it to be possible to determine whether divergences from this "normal" are "anomalies" or not? As regards the West African type, this degree of prognathism is, as Angle[4] pointed out long ago, characteristic of the race. And what is there to prevent the intermediate forms from being regarded as characteristic, so long as the condition is physiologically perfect, even though the type is rare in its own environment? According to Simon, the degree of prognathism can only be determined by examining the position of the upper teeth in their relation to the orbital plane. Consequently racial types with normal mastical occlusions in various gradations of prognathism can be determined by taking measurements of their prognathous position in relation to the orbital plane. A prognathic condition declared to be an anomaly in a racial type then becomes identical in degree with one which in another type is judged to be normal and, therefore, does not require treatment.

Should we then with our present knowledge base our views on the assumptoin that there exist only such anomalies as have so far been observed, or are

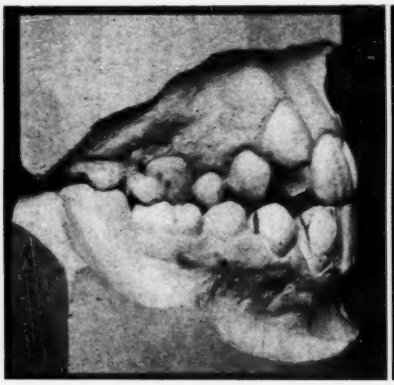


Fig. 56.

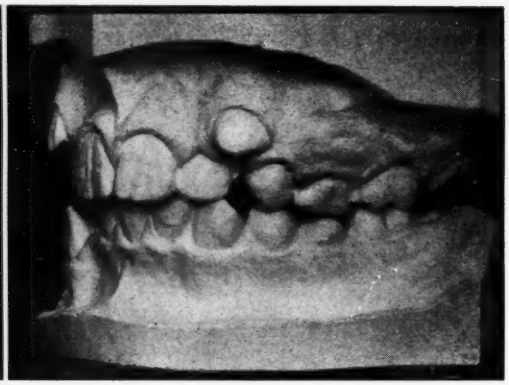


Fig. 57.

we to assume the existence of something that has not been proved to exist, but is, on purely dimensional grounds, conceivable? To me it seems obvious that there is no reason for assuming a too prognathic position of the upper jaw before it has been demonstrably observed or before especially weighty reasons have been adduced for its potentiality. One example perhaps will serve to illustrate this. The so-called progressive form of progenie sometimes reaches a mesial occlusion to the extent of the mesiodistal diameter of two premolars, while the apical curve increases in width and length to a greater extent than the coronal curve. As yet no similar condition in the upper jaw has been described. Is it more correct to assume the possibility or the impossibility of such a condition? So long as no very strong theoretical reasons exist for presupposing such a type it is certainly correct not to assume its presence until a fresh experience has produced an example.

Through making an estimate of the anomalies from three dimensions, Simon has succeeded in working out a classification embracing all imaginable divergences, also including such that have never before been described. Along three-dimensional lines any one object's divergence from another can of course be

determined with a precision that is only limited by the imperfection of the methods of measuring.

Are there then any weighty reasons for assuming the existence of an upper jaw in a too prognathic position? For the sake of lucidity we imagine two possibilities, that the relation between the coronal and apical curve is either normal or not. The normal relation between these curves again offers in its turn two possibilities. They are best illustrated by Fig. 55, borrowed from Cryer's Fig. 322.[20] It shows the profile of an orthognathic upper jaw so superimposed on the cranial profile of a West African that the cutting edges of the central incisors conincide. These cutting edges are thus at the same distance from the orbital plane of the skull. The one possibility in the case of normal curves is represented by the dental arch of the African skull, the other by the orthognathic dental arch imagined as belonging to the skull. What is characteristic in the latter case is that the apices of the incisors are a position, anterior to the subspinale. The former possibility is passed over here, as we take

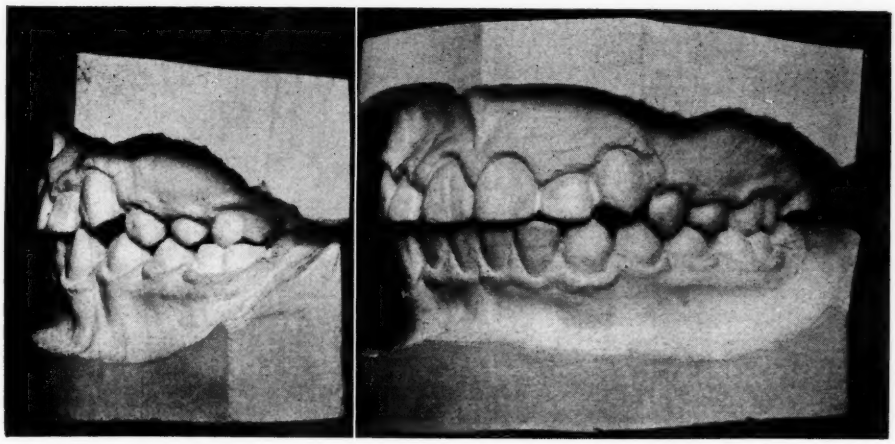


Fig. 58. Fig. 59.

it as normal. The latter may perhaps be temporarily attained by orthodontic means. Up to the present its natural existence has, as far as I am aware, not been observed. Now it might be imagined that an anterior deviation of this kind would have taken with it more of the surrounding parts than is taken for granted in this figure. Should a correction be then planned, it would involve the readjustment of the surrounding region, which would not be possible by merely orthodontic means, nor advisable even if it were possible.

3. Prognathism of the Upper Jaw in Cases of Abnormal Apical Base and Coronal Curve

Since, as has been shown above, an upper jaw which in itself and without reference to its craniometrical position is normal, can be in a position a certain distance anterior of what is usual for the race, and as races undoubtedly exist in which the same degree of prognathism is the rule, the former gives the same craniometrical result as a normal specimen of the latter race. Were we to allow this craniometrical result to determine the nature of the treatment, it would be similar in both cases, in the one case a correction of a racial anomaly,

in the other case the production of one, which would be irrational. If we were to let the result determine our action in the one case and not in the other we would be trusting to a degree of knowledge regarding racial types which must be considered quite unwarranted. The most serious objection to alterations of normal mastical occlusions, however, is this, that no proofs have as yet been published; that the results of such facial-orthopedic operations are functionally and hygienically as valuable as the original condition.

Under such circumstances no evidence that a normal upper arch of teeth can be regarded, in respect to its prognathic position, as an anomaly that should be subject to treatment, has yet been produced, and there are strong reasons for believing that the matter is incapable of proof, since every deviation of this kind arising in a race may equally well be regarded as a "fresh experience." There remains then the second possibility for an abnormally prognathic arch in the upper jaw, namely, that the supposed forward deviation has resulted in a change of the position of its teeth in relation to one another.

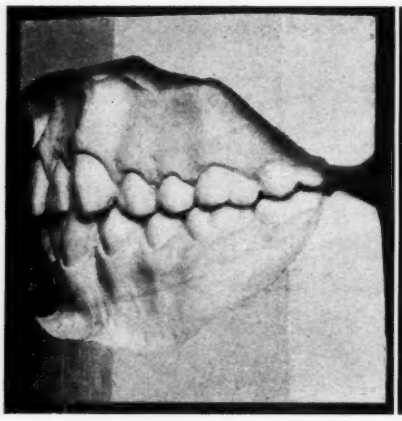


Fig. 60.

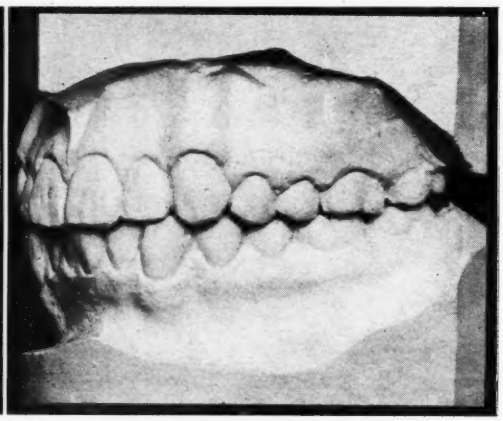


Fig. 61.

For sake of clearness we disregard local dislocations following the loss of temporary teeth or other purely local disturbances. How can we now determine whether or not the upper arch has drifted too far forward?

In the foregoing it has been stated that an abnormally large apical base in the upper jaw analogous to that which may occur in the lower jaw has not yet been described. Whether or not an upper arch having a normal apical base is too far forward or not cannot with any certainty be determined, as equally sound reasons can be adduced to show no anomaly whatever exists. There remains then as the only possibility that a prognathous upper jaw must have a too small apical base.

Upon a description being given of the momenta of malocclusion in the apical base of the upper jaw, three such momenta were accounted for in which the apical base was undeveloped, viz., bimaxillary crowding, opistognathism and narrow palatal arch. The most important in this connection is opistognathism. Cases of opistognathism may be found with such an extremely inadequate development of the intermaxillary bones that any correction to normal occlusion, with consequent normal apical spaces, would result in the apices

of the front teeth of the upper jaw being placed in a considerable distance anterior to the subspinale. (Fig. 56.) It would then be an obvious conclusion that in this case a real prognathism of the upper jaw, combined with progenie, had arisen, as the buccal teeth of the upper jaw had come too far forward, and in connection with the abnormal position of this jaw, the development of the incisor section had been arrested. If now it were possible to show, e.g., by Simon's method, which tooth should lie in the orbital plane, it would be easy to determine whether a prognathism of the upper jaw had arisen. But taking into consideration the various degrees of prognathism associated with normal mastical occlusion existing amongst our own race, it is obvious that we can assume with at least equal certainty that a clear case of prognathic upper jaw with inadequately developed intermaxillary bones must be regarded as an opistognathic anomaly of an otherwise normal case.

As a possible aid to an endeavor to determine whether prognathism of the upper jaw exists, it then remains for us to observe the mesiodistal position of the lower jaw in relation to the upper jaw. If in a case of distoclusion we were able to determine that it was the lower jaw that stood in normal position, the possibility of a prognathic position of the upper jaw would be proved, and Angle's theory of the first upper molar being the key to the occlusion overthrown.

The possibility of proving this has not yet been confirmed. But if such a prognathic position were possible we ought to meet with such cases combined with distoclusion, as these latter are quite common. But in such a combination the mesiodistal dislocation would be more than what seems hitherto to have been observed as the maximum. A mesiodistal dislocation of such dimensions has probably never been described.

The question whether the upper jaw can be in an abnormal prognathic position, therefore, is for the present impossible to answer with any certainty. We must content ourselves with expressing an opinion as to its probability. If we then confine ourselves to what has been published, there appears to be no reason for supposing that an abnormally prognathic position of the upper jaw exists. The reasons are as follows:

1. Normal mastical occlusions (and consequently also upper jaws) exist in various degrees of prognathism in different races of mankind. As a large number of the oldest findings of cranial parts of man are marked by a high degree of prognathism, it is probable that when such an anatomical form is found in people living at the present day it must be regarded as a case of atavism.

2. A prognathic position of the lower jaw has been observed in varying degrees. A development in the apical region is then often noticeable, the teeth acquiring a slant with the apical curve too large in relation to the coronal curve. Analogous cases are inconceivable, or at least have never been described as existing in the upper jaw.

3. Mesiodistal deviation has not been described of a degree that would be the case if the prognathism of the upper jaw were combined with distoclusion.

4. Greve's Classification

Greve[27] advances against Angle's Classes II and III that a differential diagnosis of dissimilar cases in these classes is not possible, seeing that, for example, a distoclusion is placed in Class II, being either an upper prognathism or an opistogenie. He considers that this differentiation ought to find expression in the diagnosis and has drawn up a classification having the sagittal position as a basis, and thereby naturally gets 8 classes.

As regards the existence of the various combinations, it is admitted that, of course, other combinations of momenta of malocclusion than those stated here can be conceived. If we now utilize the terminology of the momenta of malocclusion for these 8 classes of Greve's, we will obtain the following equivalents:

According to GREVE:	*Equivalent momenta of malocclusion:*
1. Unterkiefer zurückstehend, Oberkiefer normal.	1. Distoclusion. Arrest or development of the lower jaw caused by extraction.
2. O. zurückstehend, U. normal.	2. In my opinion the entire upper arch is never located too far back*. On the other hand it sometimes occurs that the intermaxillary bones are inadequately developed, which gives an impression of opistognathism.
3. U. normal, O. vorspringend.	3. Although any tooth in the upper jaw can be too far forward, it does not occur that an entire normal upper arch may come into such a position, as the upper apical base in its entirety has not been proved capable of adopting such a position in contrast to the lower apical base, which both can be in an anterior position or have an abnormal width. It is true that upper premolars and molars can be subject to a forward dislocation, thanks to the early loss of temporary teeth. But that then the cuspids should be able to force themselves between and cause even the incisors to erupt in a corresponding anterior position, as Case believes, has never been proved. And since the upper apical base in its entirety cannot come too far forward, the impression of prognathism is merely the result of a labioversion of the incisors with or without subdevelopment of the apical base. In the latter case spaces arise between the incisors. Cases of this Class 3 thus do not exist, but might possibly be brought about by orthodontic means (e. g. by a faulty treatment of malocclusion, resulting from premature loss of upper temporary cuspids and premolars).
4. O. normal, U. vorspringend.	4. Progenie.
5. U. zurückstehend, O. vorspringend.	5. Does not exist for the reasons given above (see 3).
6. O. zurückstehend, U. vorspringend.	6. Can only occur as opistognathism in combination with mesioclusion (see 2).

*) See note page 47.

7. U. zurückstehend, O. zurückstehend.	7. Can only occur as opistognathism in combination with opistogenie, which in this connection cannot properly be termed distoclusion.
8. O. vorspringend, U. vorspringend.	8. Can only be conceived as existent in cases of progenie in connection with an overexpansion of the upper jaw in a forward direction arrived at by orthodontic means. (See 3).

(To be continued.)

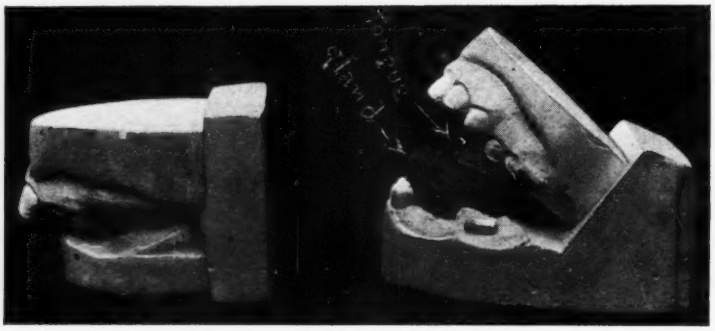
CONGENITAL ABSENCE OF THE TONGUE*

By Harold G. Watkin, L.D.S.

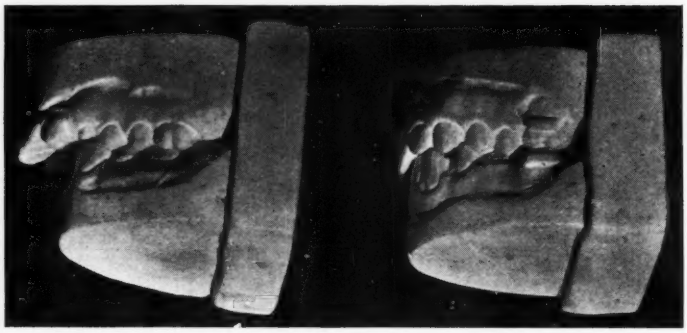
THE author said that the case was that of a girl, the youngest of a family of six. The child was a bright child, with a splendid brain, and was nearly at the top of her class in school. To be strictly correct, the anterior two-thirds of her tongue were entirely missing, and a rudimentary posterior one-third was present. In the mandibular jaw three incisors and two molars were absent, and in the maxillary jaw one premolar and two molars were also absent. No extractions had been performed. The distance between the lingual surfaces of the two mandibular first permanent molars was only 16 mm., and the only permanent teeth erupted to date were the first mandibular molars, the right mandibular canine, the mandibular right lateral, and the mandibular left central. The others present, as shown by the x-rays, were the four mandibular premolars and the second permanent molars, but no wisdoms were present in the whole mouth. There was little doubt that it would be possible to expand the jaw sufficiently to allow them to erupt, and the radiograms showed that they were in a very good position. Apart from the smallness of the mandible (which might or might not be accounted for by the absence of the tongue), there was another most interesting feature, and that was the tremendous hypertrophy of the sublingual gland. The hypertrophy of the gland had made very good speech possible. There was one sound which the patient could not make properly, and that was the "hiss" which was common to the letters "c," "s," and "x." There seemed to be some inability to regulate the amount of protrusion of the gland to make that sound. The "t" and "th" were pronounced perfectly, as also were the other dental sounds. When the gland was at rest is subsided into the floor of the mouth and did not look abnormally large. A model, which was shown to the members, gave a good idea of the size of the gland. The model of the tongue and the gland had been done by measurement from the actual patient. The greatest width of the gland was 30 mm., which was nearly double the distance between the two molars, so that when the mouth was open the gland nearly covered the occlusal surfaces of the molars. Some three years previously the child had the appearance of a typical case of Angle, Class II, Div. 1.

*Transactions of the British Society for the Study of Orthodontics.

Bands and arches had been fitted and intermaxillary traction had been used. The maxillary incisors had been moved posteriorly, and the mandibular incisors had been brought forward, so that the mandibular lip closed naturally over the labial surfaces of the maxillary incisors and the side view of the face left little to be desired. In conclusion, he added that the whole viscera was reversed, the heart being on the right side and the liver on the left. He also added that if the society desired it he could bring the patient up for the members to see.



Case I. Radicular Tongue.



Before treatment. After treatment.

Case II. Thumb Sucker.

A TREATED CASE OF EXCESSIVE THUMB-SUCKING

Mr. Harold G. Watkin then explained to the members a case of thumb-sucking which was a Class I of Angle, and was chiefly interesting because of the deformity. In the first model which he had of the case, on the right side there was only a space of 3 mm. between the anterior surface of the first mandibular molar and the distant surface of the mandibular canine, and both premolars were impacted, as was shown by the x-ray. On the left side the first premolar was erupted and the space for the second premolar was entirely missing, that tooth being impacted. The second x-rays, taken twelve months later, showed that the teeth were erupting nicely and that the bone was well formed. In the final model, the two mandibular centrals, laterals and canines were raised off the hard palate, and they occluded normally with the maxillary centrals, laterals and canines, which greatly improved the appearance because the lower lip closed normally over the maxillary incisors.

Retention had been applied to the mandibular incisors by a lingual wire which was soldered to the two pinch bands on the mandibular canines, in the ordinary way. Although the mandibular second premolars both erupted lingually, they were at present in normal occlusion with the maxillary teeth, there being little danger of relapse. He said he was carefully watching the maxillary incisors, and there seemed to be no tendency for them to move forward as the lips were functioning normally and the patient was sleeping with her mouth closed. He concluded by saying that the child was twelve years and eight months old, that thirty-five visits had been paid in twenty-two months—nineteen visits had been paid in twelve months between models I and II, and sixteen visits had been paid in ten months between models II and III —and that a new lower arch was fitted after sixteen months. He then showed the models to the members, and said he would leave them with the society, for which the chairman thanked him on behalf of the members.

DISCUSSION

Mr. W. W. James, after congratulating Mr. Watkin on his cases, asked whether he was sure that what he called sublingual gland was really sublingual gland or tissues on the floor of the mouth.

Mr. G. Northcroft asked if Mr. Watkin would deposit the models showing absence of the tongue in the Odontological Museum of the Society of Medicine at the Royal College of Surgeons.

Mr. Watkin said he would make another copy of them and let the Odontological Museum have one also. In reply to Mr. James, he said that what he had called the sublingual gland had all the external appearance of the sublingual gland. In addition, Mr. Douglas, one of the leading surgeons in Liverpool, who was very interested in the case and who discovered the transposition of the viscera, was of opinion that it was the sublingual gland. At any rate, whatever it was, it was some tissue which Nature had provided for giving speech, and the child spoke remarkably well.

DENTOFACIAL DEFORMITIES AND THE THORAX*

By Dr. Corrado d'Alise, Naples, Italy

WE have lately seen a revival of the theory, which was so strongly held in ancient Greece, that bodily physical culture not only tends to make the organism strong and quicker in its various movements, but that it develops even the intellect. This revival has brought about many congresses for physical education of children and adults; the author is, however, inclined to believe that the majority of our modern teachers might perhaps have obtained more satisfactory results.

By trying to systematize and generalize to a great extent they have fallen into a profound error which is common to our time, that of considering and taking into account each part of the human body separately, without considering or taking into account their harmonious function as a whole.

They have tried to create and turn man into an athlete, forgetting that athletics in itself is an unbalanced condition of the human organism and, as such is pathologic, and that all individuals cannot be submitted to the same gymnastic régime nor to the same degree of exercises. And nobody seems to have thought that both in the ancient and in the modern physical culture of man the most important part of the individual, the head, has been forgotten, as if that part which contains the brain and all the sensorial organs were not subject to the same biologic laws which govern the rest of the body. This omission and neglect to take account of the importance of this biologic fact relating to the head has caused really disastrous consequences. As a matter of fact, from the moment the newborn child has left the maternal uterus the first two functions which Nature establishes are respiration and nutrition. Now these fundamental functions of animal life are guided by instinct; that is why these functions are established without any trouble when the child is fed by its mother, so long as both are normal in constitution.

It is quite different, however, even though the mother and her newborn baby be in the same condition, if the child is fed artificially. In this case, not only does the latter's nutrition undergo such alterations as to even endanger its existence, but its general development, and particularly that of the face, is deeply affected, for in artificial feeding, to say nothing of the other disadvantages, the facial muscles get neither normal nor harmonious activity. When the child is weaned the same unfavorable conditions persist. It is a fact that in the present day artificial feeding is becoming more and more frequent, while the later nutrition of the child and of the adult is becoming daily more distant from the normal, continually producing more serious results in growth.

*Transactions of the European Orthodontological Society.

The child has a strong dental system, with twenty teeth at the age of thirty months—and of these eight are molars. This strong system demands vigorous exercise of the masticating muscles so as to have normal function, whereas it is almost unused with our modern methods of feeding, thus often causing irreparable disasters. The results of this error reflect not only upon the teeth but on the whole organism, from general nutrition to the irregular and abnormal development of the facial bones, to the cavities and organs contained therein, and more especially to the oral cavity and nasal fossae, which will be more particularly considered in this essay.

The human race is declining; morbidity increases, the average length of life itself decreases, while cases of longevity are becoming more unusual every day. But these truths, so easy to control, and accepted by the majority, are often discussed by hygienists. At the Italian Congress of Stomatology held last October in Rome, the essayist read a paper on "Facial Orthopeutics in Present-day Medicine," and to prove the decline of the human race the writer said: "You will not believe that most of our children are defective, that their constitution is further from normal than that of preceding generations, that human health is daily growing worse; and you pretend that modern progress in methods of scientific investigation reveal ills and physical defects which formerly passed unperceived. You might even be right. But apart from every other consideration, I beg of you to compare the dental system and dentofacial deformities of the children of today and of their parents. You will easily verify that the dental system of the children is considerably worse and that the dentofacial deformities (prognathism, gothic arch, narrow dental arches, etc., etc.) are not to be found in the parents, or exist only to a minor degree."

Now in view of these frequent—and evident—observations of fact we are led to ask the question: "Are these conditions the expression of human evolution, as one might suppose them to be, at their origin (Talbot, Adloff), or do they represent phenomena of degeneracy?"

As supporting this second hypothesis we find that an imperfect dental system is always the expression of a defective organic and functional condition of the entire human organism. That is certainly one of the most frequent and important causes of abnormal development in the child and of faulty functional conditions in the adult.

Amongst the most important and serious causes of human morbidity and mortality today we find syphilis and tuberculosis. Consequently hygienists have concentrated their efforts against these diseases, especially since the discovery of their respective specific microorganisms. Well, even here the results achieved have not come up to general expectations.

As concerns syphilis, it has been proved that even after the discovery of the Treponema pallidum its frequency still increases; that all the researches for prophylaxis against this disease have, for the greater part, remained purely theoretical, while the problem of prophylaxis of syphilis should be considered as a problem of moral education.

As concerns tuberculosis, on the contrary, it is now proved that if Koch's bacillus is indispensable in producing the disease, it cannot take root, as it

were, in the organism without a certain predisposition, while the theory of heredity of tuberculosis is not founded so much upon the transmission of bacilli from the parent to the child as upon constitutional and organic conditions of hereditary predisposition. And today there is no doubt that a defective dental system is one of the most dangerous predisposing conditions for tuberculosis, not only because, through dental caries and on account of septic conditions of the oral cavity the penetration of the tubercle bacillus is very easy, but also because a faulty dental development weakens the essential functions of animal life, which are digestion and respiration.

If we examine the bones of the face of a child or an adult whose teeth are normal in number and position, we notice the wonderful and harmonious interdigitation of the multiformed and numerous cusps and inclined planes of the teeth, and corresponding to this harmonious arrangement of the teeth there is harmonious formation of the bones of the face.

What is the meaning of this harmony? The bones, as well as the teeth, are passive portions of the face, and the muscles which are attached to them are the active portions. Why is it that, while we note that normal development of the limbs and trunk demands sufficient functional exercise of their active parts, the muscles, why then do we not apply this some biologic law to the face, where the first and most important step in digestion takes place, viz., mastication and intraoral digestion of food, as well as the first and most important step in respiration, viz., penetration, purification, moistening and warming of the air we breathe? The respiratory function is involuntary in all its phases; on the contrary, the first phase of digestion, which takes place in the mouth, is voluntary. Herein resides *the* importance of the point which I wish to develop—the masticatory function as the essential condition for normal development of the respiratory apparatus.

The muscles of mastication, both direct and indirect, are nearly all the muscles of this region, and their action presides over the development of the face and soft parts. It is therefore evident that if these muscles do not work sufficiently and in harmony the development of the facial organs will also be insufficient and disharmonious. As a consequence we will have various abnormalities in the development of the dentofacial bones (facial asymmetry, narrow dental arches, prognathism, gothic vaults, narrow nasal fossae, bending of the septum, etc., etc.). All these conditions, to a greater or lesser extent, impair the masticatory and respiratory functions. It is therefore useless to expect a normal chest development when the gateway to the respiratory tract is obstructed or narrowed. Under such conditions gymnastic exercises of the limb and trunk are useless and even harmful, as they overwork the heart and organism and cannot develop the thorax and lungs normally. The author has reached these conclusions after careful examination of the oral cavities of children from three to fifteen years of age, during development, who are inmates of a charitable institution. These conclusions were confirmed when, having observed an almost constant relation between the development of dental arches and general health, the essayist observed that malocclusions are very frequent among the tuberculous and heredosyphilitic patients. It was then decided to measure the respiratory capacity of

children with normal occlusion and of those with malocclusions and to note the relation between dentofacial deformities and the development of the thorax.

Children of the same age were chosen, and of approximately the same height, half having normal occlusion and half having malocclusions. Each one was tested with the spirometer of Hutchinson* for respiratory capacity, ten to fifteen times at each sitting, during ten consecutive sittings. The results obtained are submitted in Table I.

TABLE I

NOS.	NAME AND SURNAME	OCCLUSION	AGE	HEIGHT IN CM.	THORAX IN CM.	WEIGHT IN KILOGR.	VITAL RESPIRATORY CAPACITY IN C.C.
1	Conzales, Amleto	Cl. II, div. 2	9	118	60	23.300	1,200
2	Rodriguez, Adolphus	Cl. II, div. 2	10	117	59	23.600	1,200
3	Montagnolo, Anthony	Normal	9	115	60	22.700	1,300
4	Pellegrino, Joseph	Normal	8	116	65	25.000	1,400
5	Russo, Charles	Cl. II, div. 1	10½	125	70	31.000	1,300
6	Palumbo, Jerome	Cl. II, div. 1	11½	123	64	24.600	1,400
7	Pellegrino, John	Normal	11	122	65	26.200	1,500
8	Tervolino, Janvier	Cl. II, div. 1	9	129	60	24.200	1,400
9	De Luca, Louis	Normal	10½	129.5	67	29.700	1,700
10	Mellili, Anthony	Normal	12	130	69	32.000	1,900

From these results the essayist believes that he can draw the following conclusion: that malocclusions are almost always accompanied by insufficient thoracic development. If we study the above table we see that in Nos. 3 and 4, with normal occlusion and height and weight inferior to Nos. 1 and 2, the respiratory capacity is 1,300 and 1,400 respectively, while in Nos. 1 and 2 it is only 1,200; in No. 7 with normal occlusion, but shorter than Nos. 5 and 6, the capacity is 1,500 while that of Nos. 5 and 6 is only 1,300 and 1,400 respectively; finally in Nos. 9 and 10, with normal occlusion and almost the same stature as No. 8 the respiratory capacity is 1,700 and 1,900 respectively, while in No. 8 it is only 1,400.

DISCUSSION

The President said it was obvious Dr. d'Alise's paper had taken a great deal of time and thought to prepare. It was astonishing, he thought, how much even those who could not understand the language in which the paper was delivered could get out of it by the time the discussion was over, and he would ask those who were able to do so to discuss the present paper fully, so that those who did not understand French might extract as much benefit from it as possible.

Dr. Quintero said the paper brought forward a great many points which people did not really know, though they might have thought they did. It had always been said that children with malocclusions had narrow chests, but no one had ever thought of seeing if it were true before. The author, however, had gone to the trouble of measuring hundreds of children, although he had only dealt with about eleven in his paper. He had, therefore, been able to supply absolute proof that what was thought to be true was really so. Referring to some of the cases mentioned by Dr. d'Alise, he mentioned one of a child of ten,

*Hutchinson, examining some 2,000 persons, was able to formulate the law, that the maximum volume of expired air in normal conditions is in regular—if not mathematical—proportion to the height of individual.

1.10 meters in height, who had a lung capacity of only 900 c.c., with a second class malocclusion; while another of the same age, with normal occlusion, had a lung capacity of 1,300 c.c., or about half as much again, and a third, 12 years old, with normal occlusion, had a lung capacity of 1,900 c.c., or a little more than the first case. It would therefore be seen how important it was to prevent malocclusion by every possible means, and to try and get children to develop normally, so that they would have normal lung capacity. He desired to congratulate Dr. d'Alise on his most interesting and instructive paper.

Dr. S. Dreyfus (Lausanne), speaking in French, thanked Dr. d'Alise for his work, which was of the greatest interest, and the results of which were in absolute agreement with what he himself had said earlier. He was happy to find himself in complete agreement with all Dr. d'Alise had said.

Dr. B. M. P. Schroder (Paris) expressed satisfaction that so many recent papers dealt with the prevention of malocclusion. To commence with, only a very few people were able to benefit by orthodontic treatment, but it was spreading, and the time could not be far off when hundreds and thousands of children would be relieved from malocclusion by its means. He thanked the author for his extremely interesting communication.

The President, before calling on Dr. d'Alise to reply, said that now he had learned from Dr. Quintero what the aim of the paper was, and that it went to prove orthodontists were on the right track in regard to the prevention of irregularities, he would like to congratulate Dr. d'Alise on his work. It was another feather in the Society's cap that an Italian member should take the trouble to make all the measurements which the paper contained. He wanted the author to feel that the Society was most grateful to him for his paper.

Dr. d'Alise, in reply, thanked those who had spoken for their encouraging references to his work. The best reward a student could have was to know that others were interested in his work. He had been much encouraged by what had been said, and would continue his work to the best of his ability.

Report of Cases*

Dr. Quintero presented a model of a case that had puzzled him considerably and asked for advice. The model was considered by the meeting and views were put forward conversationly by many members.

Dr. Beach also exhibited some models and illustrations of cases of Dr. Hipwell. In the course of his remarks he said the orthodontist must be an idealist and must have something in his mind to work to, a sort of vision. As had been said, where there was no vision the people perished, and certainly an orthodontist could not succeed without a definite view.

(The pictures of several cases were shown, some of which had special reference to diseases of the eye, a subject with which Dr. Borsch had dealt on the previous day.)

Dr. Beach said that notwithstanding the thought that orthodontia was the sole cause of the beneficial change in many cases, they must not lay too great stress upon it, because naturally any development of a child on correct lines always brought about changes which were beneficial and developmental. Orthodontia was one of the most important factors in the restoration of the abnormal to the normal. Oral occlusion was the basis of dental restoration and the orthodontist had to go back to occlusion as the fundamental thing. The correlation between the dentist and the general practitioner was very marked, particularly in the realm of prosthesis. One thing Dr. Young had spoken of on the previous day was very important, namely, more thorough radiography. He had been taking complete radiographs for years and was following the lead of Dr. Ward of New York, who was practically the first man to take full radiograph pictures of his cases. The general practitioner should do that as much as possible because he would find by studying the radiographs many things that were otherwise unseen. After one or two years he liked to take other radiographs so as to have the opportunity of watching the changes and of prognosticating possibilities. He entered a plea for the more general use of the radiograph but preferred to interpret it himself rather than to have it interpreted by somebody

*Transactions of the European Orthodontological Society.

who did not know so much about the case. With regard to the third molar, he had never seen the matter taken up as Dr. Young had taken it up, in trying to build about it some definite procedure. Up to the present time the question had never been put to him, but he should like to ask whether the third molar was not affected by the general shortening of the mandible, and was not that shortening a factor in the eruption of the third molar. Was there an evolutionary process going on in the general shortening of the mandible? A thousand years might be needed to show the change, but in the mixed races of modern civilization the various conditions were being more or less brought prominently forward. Before the radiograph was invented he endeavored to tell his patients that the third molar was something of an appendage like the vermiform appendix which had no special use and was gradually being eliminated; but now the x-rays were available it was found that the third molar was generally around and as a rule where it was not wanted. He preferred the term malposed to the term impacted in the majority of cases. An impacted molar was one which almost always needed surgical removal. What proportion of third molars caused reflex pathologic conditions was another question which needed investigation, and he did not think there was any definite literature on that subject. He often thought that the operation for the removal of the third molar was generally too early; it should be given a chance, but when the case became acute it should be got rid of. Dr. Davenport had spoken of conditions almost bordering on pyorrhea, gingivitis, etc., and that was due to the lack of the ability of the tooth to take its place. In America he believed they were extracting third molars. The young ambitious exodontist liked to see a third molar coming along and was very apt to make a hospital case of it, but he himself was firmly convinced after years of experience that it was necessary to deliberate a little before surgically removing the third molar and not attribute so many reflex conditions to it. The orthodontist never extracted, but necessarily must give advice with regard to the removal of a third molar in order to protect the general occlusion.

Dr. Lowe Young said that before he made any remarks about the case of Dr. Quintero he had to ask the doctor a few questions. Dr. Quintero had said that he had no x-ray pictures of the case, but he should like to know what the history of the patient and what teeth had been extracted. It was evident that the lower first permanent molars had been removed at some age.

Dr. Quintero said the patient was young, probably about seven or eight years of age.

Dr. Young said he would have judged so. He had told Dr. Quintero privately that when a difficult set of casts were put into his hands and he was asked to express an opinion, that opinion was always subject to change, because he considered that any experience given on a set of casts after a few minutes' observation was a snap judgment and that if instead of casts he had the patient present he might outline a different kind of treatment. All he could say from the set of casts that had been shown was what he would consider tooth movement for that particular set of teeth. From Dr. Quintero's description the upper laterals were congenitally absent. There was a space of thirty-hundredths of an inch between the two upper centrals, and the left canine was practically in contact with the left central and the right canine had about five-hundredths or six-hundredths of an inch space between itself and the central. The right first premolar was in contact with the first permanent molar, and the second premolar was pointing lingually. If an x-ray picture was taken through the top of the head to show the position of the right second premolar it was fair to presume that it was almost where it should be. The upper first permanent molars were rotated. A line passing through the buccal cusps of the upper right first permanent molar touched the mesial surface of the left central and should pass buccally about three hundredths or four hundredths of an inch of the premolar. The left premolar was not rotated quite as badly. The central incisors were lingual to the lower. It was a case of Class I, but a mutilated case complicated by teeth that were congenitally absent. The first thing in the treatment of a case of that kind was the question of what was to be accomplished. He himself would not try to close up the spaces of the missing laterals but would put an appliance on the upper arch so constructed as to carry the central into contact with the other central, and he would bring the right canine up. The canines looked like a cross between a canine and a lateral, and they could be made good-looking lateral incisors that nobody but a dentist would mistake for anything

but laterals. He would bring the right first premolar forward sufficiently to bring the second premolars in place. He would rotate the upper molars and bring them practically to their normal position. Then he would carry the two centrals and two canines forward and get the teeth outside of the lowers. He would band the first permanent molars with half-round tubes both bucally and lingually, and he would band the left first premolar, the canine and the central and the right central and canine and the first permanent molar with the same kind of tubes. Then he would construct what was known as the Angle pin and tube appliance but modified by using small half-round tubes on the anterior teeth, and the appliance would be constructed with a loop at three points, one being close to the molar, so that by opening and straightening out the loops slowly from time to time the whole thing was carried forward. The right central would not be fastened on to the appliance at all, nor the right canine. He would use an auxiliary wire to which would be soldered a pin to go into the tube on the right central. From time to time he would take the appliance off and close the loop up a bit and bodily carry the tooth forward. The cuspid would follow along but would not entirely take its place. After the central was in its place he would hitch on to the canine in a similar way. In doing that the space between the first premolar and the first molar would be gradually opening to accommodate the second premolar. That would be done by the first main appliance, by having a band and small tube on the first premolar and a loop that could be opened up gradually. Later on, after the first work had been accomplished he would lift the second premolar and would construct a lingual wire which would fit into the tubes and solder a little auxiliary spring to rest on the lingual of the second premolar and carry it out. It was remarkable how teeth that were so horribly malposed when they were attracted in the right direction seemed to desire to get into their proper place. There was forty hundredths of an inch between the first premolar and second premolar on the left hand side, as if the first molar had been extracted. The lower centrals, he believed, were too high, having elongated owing to the lack of use. What was to be done depended on what kind of artificial appliance was used, but the patient had to have something if any good was to be done. If it were in his daughter's mouth he would extract a second premolar, which was a little bit of a thing and would not have any masticating service. He would straighten up the second molars and rotate them slightly and would carry the right premolars up in contact and bring the left premolar up in contact. That could be done with a pin appliance. In the median line he would use a half-round tube because it gave absolute control. Between the pins that telescoped into the tubes on the two centrals he would put a loop. In the teeth under consideration the roots were coming together, and if a separate wire was used with two pins soldered to it it would lie directly over the tubes and it could not be used without great annoyance to the patient, but if a loop was put in with a spring it might be put in without any annoyance and the roots could be drawn apart and the incisor ends brought together. Also the teeth could be depressed by putting locks on the pins with catches for the tubes on the canines and the laterals, and in that way he could see a very helpful result to the patient, but it could not be perfect.

THE USE OF A ROUND WIRE BUCCAL ARCH PRELIMINARY TO THE USE OF THE RIBBON ARCH*

By C. A. Hawley, D.D.S., Washington, D. C.

THIS clinic is to show the use of the round wire buccal arch preliminary to using the regular ribbon arch. The bracket bands are adjusted in the same way as for the regular ribbon arch. The curved sheaths are adjusted on the molar bands well to the occlusal edges so as to avoid bending the

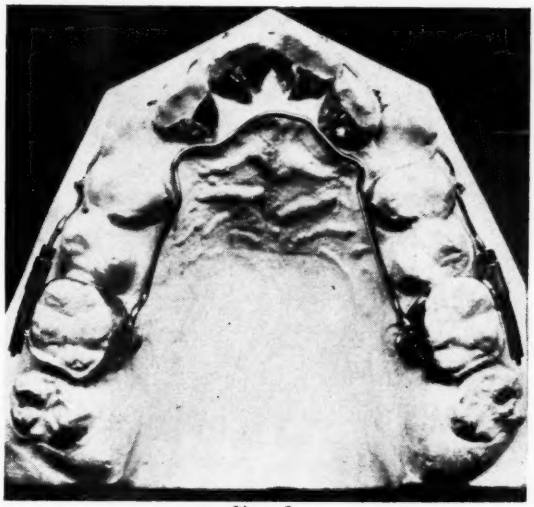


Fig. 1.

Fig. 2.

ribbon arch when it is finally adjusted. Vertical tubes are placed on the molar bands for a lingual arch to secure complete control of the movement in the molar and premolar region. It is not necessary that this lingual arch be worn all the time after the expansion is completed (Fig. 1). A round wire, .018 to .022, with ribbon arch screw and nut soldered to the ends is used in the beginning, and until the teeth are well aligned. I use the ends of discarded used arches for the purpose. Then flat ribbon is adjusted for root movement. This round wire is so flexible that it can be easily bent into the

*Proceedings of the European Orthodontological Society, 1922.

brackets. The lock pin heads draw well under the brackets and fasten it securely. The advantage of using this round wire at first is that its action is very gentle and does not cause so much soreness as is usual when the ribbon wire is used at first. And it does not exert root movement until the teeth are properly aligned and the change is made to the ribbon wire. It is not often desirable to combine alignment and root movement. Many operators have experienced great difficulty in using the ribbon arch on account of the soreness caused by severity of the first application. This is avoided by the use of the round wire (Fig. 2).

Communication

Dear Sirs:

Enclosed you will find a radiogram which will undoubtedly be of interest to many of your readers.

The patient, a boy of eight, presented a slight swelling under the tongue and it was diagnosed as ranula. The radiogram reveals a slight streak as

shown in the illustration. Upon operation the bulb of a clinical thermometer about ¾ inch in length was brought out. The boy remembered having broken one nearly two years previously but no trouble was experienced until recently.

Dr. E. P. Beadles,
Norfolk, Va.

DEPARTMENT OF
ORAL SURGERY, ORAL PATHOLOGY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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ORAL SURGERY AND ITS RELATION TO MEDICINE AND MEDICAL SPECIALTIES*

By Theodor Blum, D.D.S., M.D., (Penn.), Universae Medicinae Doctor (Vienna), F.A.C.D.

THE relationship between oral surgery, medicine, and the medical specialties cannot be appreciated without understanding what is meant by oral surgery. Literally translated, it means surgery of the mouth. A more instructive description would define the specialty of oral surgery as the one dealing with all surgical lesions arising from the teeth, jaws and surrounding tissues. Oral surgery, in a broad sense, includes in its sphere malignancies occurring in these regions, as well as plastic surgery of the face. No specialty, surgical or otherwise, can possibly be so confined without bordering on and invading other specialties; and so oral surgery encroaches upon the field of the general surgeon, the rhinologist, the ophthalmologist, the neurologist, etc. If such borderline cases arise from the dental system, the jaws or oral cavity, the other specialists should cooperate with the oral surgeon. If they do not arise from these structures, they belong to the other fields. Considering this large range of oral surgery, one must admit that it would be quite difficult to be efficient in dealing with all these conditions. There may be a few who are experts in every branch of this specialty; the majority, however, restrict their field of endeavor; one oral surgeon will be more interested in plastic surgery including cleft palate and lip operations; another will prefer the care of the infectious diseases and injuries.

On account of the services rendered by this specialty in the past, the dental as well as the medical profession must agree that there is not only a great need for the specialty of oral surgery, but that the recognition of the oral surgeon as a specialist has been finally realized. Granting that the pre-

*Read before the meeting of The Eastern Medical Society, City of New York, April 10, 1925.

vious statement is in accord with the consensus of opinion of the two professions, the relation of the oral surgeon to medicine and the medical specialties can now be dealt with individually.

The relation between the oral surgeon and the general medical practitioner is of a reciprocal nature. Many conditions with which the oral surgeon has to deal cannot be properly taken care of without first submitting the patient to a thorough medical examination. On the other hand, the general medical practitioner cannot possibly consider his examination complete without a careful survey of the oral cavity and the surrounding tissues by a competent oral surgeon. This implies that the oral surgeon today also plays the rôle of consultant. The dentist engaged in general practice has not been trained to act as such a consultant and while a small minority in the dental profession is clamoring for a medical degree for the dental practitioner, past experience in the countries where an M.D. degree is obligatory before taking up the dental specialty, has shown the practitioner so educated to be inferior to the one who followed the curriculum as outlined in the American dental schools. Of course, if it comes to purely dental work, the dentist will have to be consulted either by the physician or the oral surgeon. In fact, the oral surgeon should never neglect to inform the patient's dentist as well as the physician, as to what he has found and what treatment he expects to carry out.

The dental profession deserves a great deal of credit for having advocated and executed periodic health examinations as far as its special field is concerned. To help him in this work, the dentist created about ten years ago, the dental hygienist who, in accordance with conditions prevailing, subjects all his patients to prophylactic treatment from one to five times a year under his supervision. On such occasions, incipient decay as well as diseases of the gingiva and even early malignancy could be detected. "Is it so far-fetched a thought that the dental hygienist, well trained in clinical oral pathology, will be in a position to recognize the earliest (oral) lesions suspicious of cancer before operative interference, as well as radium and x-ray treatment, have passed their usefulness, and thus save thousands of human sufferers from an untimely fate?"[1]

It must be emphasized that a periodic health examination as recommended by the medical profession cannot be complete without the assistance of the oral surgeon and dentist. The medical and dental professions believe in focal infection and the teeth unquestionably play an important part as possible foci. "Many a diagnosis of focal infection has been made without properly studying the patient. To arrive at such a diagnosis, the examination by the oral surgeon alone is not sufficient. Not only the general medical practitioner will have to examine the patient very carefully, but many other medical and dental specialists will have to be called in consultation. Only if every part of the body has been examined and found negative and foci in the oral cavity alone remain, is a diagnosis of oral focal infection possible.[2] The final word regarding oral focal infection has not been written. However, no one can give a patient a clean bill of health as far as his oral cavity is concerned unless every possible focus of infection has been removed. No matter what root canal treatment has been instituted, no matter who the operator, every pulpless

tooth, if a suspected focus, has to be removed. The mode of procedure only requires further argument.

If a patient's mouth contains pulpless teeth which have been subjected to proper treatment, it would seem bad policy to remove these teeth while infected tonsils, sinuses or other conditions have not been attended to. Only as a last resort should these teeth be sacrificed. In deciding the treatment of focal infection one must also remember that the size of the apical area is no indication of the degree of virulence of the organisms it harbors.

Nearly ten years ago, Schamberg showed that the pulpless tooth, with a very small or hardly perceptible apical area on the radiogram, is most often responsible for serious systemic disorders. On the other hand, a series of bacteriologic examinations of the contents of large cysts conducted by the writer about five years ago revealed no bacteria. Price recently confirmed the above by extensive combined clinical and laboratory examinations. He also seems to demonstrate that a patient with a high resistance will form more or less extensive condensing osteitis around these apical areas or show a large area well circumscribed with a dense cortical layer of bone. His further studies promise to throw much light on this important subject.[3] Oral foci of infection cannot be diagnosed by the medical practitioner who has no training in oral pathology; not even the general medical radiologist, and surely not the commercial x-ray laboratory, is in a position to do so. The physician who refers his patients to a commercial laboratory as well as the one who recommends the removal of certain teeth without consulting an oral or dental surgeon is open to criticism.

The oral surgeon who sees his patient for a more or less serious operation does not have the opportunity of thoroughly studying the case from the general medical viewpoint. He is entirely dependent, therefore, upon the knowledge which the family physician has gained through many years of contact with his patient. Such cooperation will naturally benefit the patient most.

Generally speaking, the relation between the oral surgeon and the general surgeon is somewhat strained. This is due to the fact that a number of general surgeons will insist on treating certain oral lesions which are peculiar to the mouth, the recognition and diagnosis of which require the knowledge of the special pathology of the teeth, jaws and neighboring tissues which is not taught in medical schools. While the general surgeon can comparatively easily take care of cases which are now treated by genitourinary surgeons, gynecologists, etc., he usually does not enter the field of the oral surgeon with safety. Which general surgeon would take care of an ophthalmologic or rhinologic case today? And still he knows more and is taught more about them than about the mouth. On the other hand, occasions will frequently arise when the oral surgeon will have to consult with the general surgeon and cooperate with him, giving the patient the advantage of his greater experience in general surgery.

When discussing the relations between the rhinologist and the oral surgeon, three types of cases must be considered. The first group is cleft palate and lip; the second, surgical conditions of the jaws proper and the neighboring soft tissues, and the third, diseases of the maxillary sinus. The first, cleft

palate and lip, can be dismissed with the statement that the rhinologist has the same moral right as the oral surgeon to take care of them, although the latter has a slight advantage over the rhinologist on account of his more intimate knowledge of the physiology and pathology of the deciduous and permanent teeth. Other surgical lesions of the jaws and surrounding soft tissues belong to the field of the mouth surgeon. The third group, diseases of the maxillary sinus, must be reviewed at length. Although it should be an established rule that diseases of the antrum primarily come within the field of the nose and throat specialist, only those cases which are distinctly of dental origin and show no involvement of the nose or other sinuses, should be taken care of by the oral surgeon. The fact alone that the dental origin has been established does not yet make it a case for the oral surgeon. X-ray plates of the sinuses and an examination by the rhinologist must first exclude a simultaneous involvement of other sinuses.

Osteomyelitis of the maxilla, if extensive, will encroach upon the antrum, but will not require a consultation with a rhinologist because the treatment of the osteomyelitis itself will clear up any infection of the maxillary sinus.

"It is quite difficult at times to establish the fact that some dental or maxillary condition is the cause of the inflammation of the antrum. But even if this is established, it will be necessary to have all the sinuses examined by means of the x-ray and have the nose, throat and sinuses thoroughly gone over by a rhinologist. If other sinuses, especially of the same side, are affected, a simultaneous operation by both the rhinologist and oral surgeon will be indicated. Acute and emergency cases are the exceptions. Inflammations of the maxillary sinus not of dental origin are cases for the rhinologist and not the oral surgeon. The patient's welfare must always be uppermost in our mind and, therefore, the statement expressed above should be generally recognized. It is unfortunate indeed that some antrum cases must be treated through the mouth. The natural opening of the maxillary sinus leads into the nose and the logical treatment, therefore, should be through the nose. It would be absurd, on the other hand, if an empyema of dental origin were treated through the nose when the tooth or root must be removed and the sinus, therefore, can conveniently be drained through the socket without disturbing normal relations in the nose. While the rhinologist and oral surgeon can serve patients best in their own field, the careful cooperation of the two can only be of additional benefit to them."[4]

While the services of the ophthalmologist are very valuable in the diagnosis of certain cases, the two specialists meet more often through the fact that in obscure cases and in those of possible focal infection, the ophthalmologist consults the oral surgeon regarding possible foci in the oral cavity. The question of oral focal infection, however, has been discussed in another paragraph.

Patients complaining of painful sensations about the face bring the oral surgeon into contact with the neurologist. There are two distinct groups of cases: the typical neuralgia and the atypical. The former is better known as trifacial or trigeminal neuralgia of which no definite etiologic factor has ever been found. The treatment consists of alcohol injections or operation.

Frazier's operation which preserves the motor root as well as some of the fibers of the first division of the fifth nerve seems to give permanent results. In atypical cases, a causative factor may be found in diseases of the sinuses, eyes, teeth and jaws, etc. It is very important, therefore, to get not only a complete general medical examination, but also one by a rhinologist, ophthalmologist and oral surgeon. If no such factor can be found, even extra or intracranial neurosurgical operations will be of no benefit in the treatment of atypical facial neuralgia. All the cases, however, for which no tangible cause of the pain can be found, should be seen by a neurologist who in turn will decide with the neurosurgeon whether or not an operation is indicated.

The oral surgeon as well as the dentist, should be fully equipped in his office for radiographic examinations. Dental and oral radiography are just as highly specialized as dental and oral surgery. If the general radiologist is familiar with oral radiography, it is rather the exception than the rule. Under no circumstances, however, has the general radiologist the authority to give advice in regard to treatment, he being a physician only and not familiar with the clinical examination and oral pathology. The oral radiologist must always consult with the patient's dentist to outline the proper treatment of teeth or the construction of prosthetic appliances if in question. While the oral surgeon must be well versed in the reading of oral radiograms, still he will quite frequently be placed in a position where he must consult with the general radiologist. This will particularly be the case where there is a suspicion of or actual sinus involvement as well as for the diagnosis of bone tumor. At times cysts in the maxilla have been diagnosed radiologically by the general radiologist from his sinus plates only.

The position of the oral surgeon as a specialist and a consultant in private practice has been dealt with and it remains now to discuss the position he should occupy in a hospital. Oral surgery has developed as a dental specialty in the dental profession and is being taught in dental schools. During the growth and expansion of this specialty, it was soon realized that the oral surgeon must have a medical foundation as well as dental training and today practically all the well-known oral surgeons hold both degrees. Oral surgery being a dental specialty must be placed in the dental department of a hospital with the other specialties of dentistry like dental radiology, orthodontia, peridontia, etc. Oral surgery is so intimately related with dentistry and its specialties that anyone familiar with the practice of oral surgery cannot possibly think otherwise. Only in those hospitals which do not conduct a dental department can oral surgery be placed under general surgery as a surgical specialty.

If the specialty of oral surgery has been progressing only slowly, conditions prevailing at present in practically all hospitals must be held responsible for it. The general surgeon and rhinologist, in most instances, do not cooperate with the oral surgeon and continue to take care of cases which are distinctly of an oral surgical nature and which they are generally incompetent of treating, for reasons previously mentioned. But, while one may differ as to who in particular should treat certain conditions about the mouth, it is obviously true that all practitioners have the interest of the patient at heart

and should, therefore, cooperate to attain this end. The ideal cooperation from a dental department and its specialties which includes oral surgery can only be had if every hospital will establish a dental service independent of the medical, surgical or any other service. It must include general dentistry and all the dental specialties and have a resident dentist with a number of dental internes corresponding to the size of the hospital. It must be fully represented on the medical board and be responsible to the board of trustees only. Oral surgery is so intimately related to dentistry that in the interest of the patient it must remain a part of the dental service, always cooperating with the various dental departments as well as other services in the hospital.

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A NEW OUTFIT FOR LOCAL AND REGIONAL ANESTHESIA IN DENTAL AND ORAL SURGERY

By Gaston Labat, M.D., New York City

ONE of the most essential instruments in the dental surgeon's armamentarium for regional anesthesia is a good working syringe which combines simplicity of mechanism with ease of manipulation and efficiency of injection.

Precision in operative technic is subordinate to the use of instruments which have been specially designed to meet specific requirements. Skill is an individual achievement resulting chiefly from the meticulous accomplishment of scrupulous technic. The more delicate and appropriate the instruments, the greater the progress towards skill and perfection.

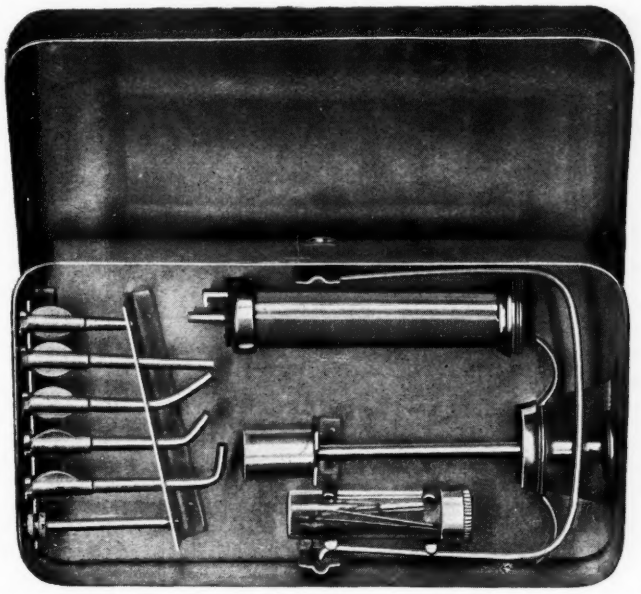


Fig. 1.—Labat outfit for inducing local and regional anesthesia in dental and oral surgery.

SYRINGE

The syringe included in the author's outfit which is here presented (Fig. 1) has been very carefully designed to fulfill the conditions of an ideal instrument. The barrel is of transparent glass with metal fittings; its plunger is all metal (Fig. 2). Both parts have been ground to fit each other air-tight so as to avoid leakage. The transparence of its barrel allows its contents to be under accurate control. The material used to fix the metal parts to the glass is such that differences of temperature will neither break the glass nor disjoin the parts, provided the correct technic for sterilization is used. When the syringe contains 5 c.c. of solution, there is still a space of 1 c.c. behind the plunger which renders

possible the aspiration test for blood. Its graduation is accurate. The barrel is closed by a metallic cover screwed onto it and provided with suitable wings for good and easy grasp during the manipulations. Absence of rings for the fingers makes the syringe fit for all hands. The friction ring hidden in the cover holds the plunger rod tight enough to prevent the plunger from being displaced by gravity; yet the plunger travels smoothly under light pressure, plunger and barrel having been ground to fit each other air-tight with minimum friction. The distal end of the barrel has a central conical tip for adjusting the needle holder, otherwise called extension nozzle, and a locking device which prevents the extension nozzle from flying off the syringe under pressure. Air-tight connection between the parts is thus well secured, while the simplicity of the device renders disconnection very easy and rapid. The syringe is of moderate weight. The ratio of its length to its diameter is such that the debit pressure at the point of the needle is a high multiple of the applied pressure. The

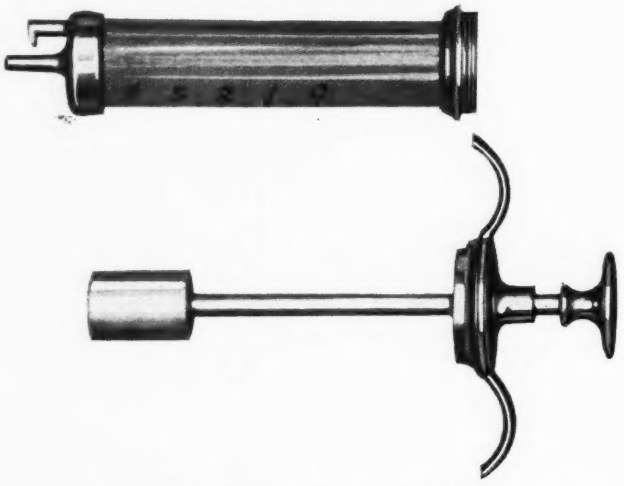


Fig. 2.—Labat syringe for inducing local and regional anesthesia in dental and oral surgery. Plunger and barrel disconnected.

plunger rod stays within easy reach of the thumb when the syringe is full. It can be sterilized by boiling or immersion in alcohol. It is repairable without noticeable interference with its original qualities.

EXTENSION NOZZLES

Five nozzles of different shapes and lengths facilitate the approach of the nerves by the oral route and permit of more refined technic and greater precision (Fig. 2). Two of these are straight and serve as extensions to the fine needles used; the other three are bent to blunt angles of 90°, 120° and 135°, thus allowing the needles to be passed in any direction with a minimum opening of the mouth. Their lengths are such as to keep the point of application of the needle within reasonable distances from the hand, thus affording greater precision of manipulation; when attached to the syringe their weight is negligible. They are provided with a bayonet lock hub having a slot on one side and helical collar and groove on the other. This device assures easy and rapid connection and disconnection and keeps the parts air-tight.

NEEDLES

The special feature of the author's needles is that each needle is complete in itself, its hub being screwed directly into the extension nozzle (Fig. 3). This connection is also air-tight and leaves no undesirable overlapping parts. They are made of rustless steel and are of four different lengths, viz., 1, 2, 3 and 4 cm. They are very thin with long bevels and sharp points; their diameter ranges from 3/10 to 5/10 of one millimeter. Their flexibility is such that there is very little risk, if any, of breakage at a nervous patient's jerk; provided that the correct technic is used. All needles and extension nozzles are interchangeable.

COMPLETE OUTFIT

The complete outfit consists of one 5 c.c. syringe, five extension nozzles and eight needles with one socket-wrench, put up on sterilizing tray and enclosed in a nickel-plated case. (Fig. 4.)

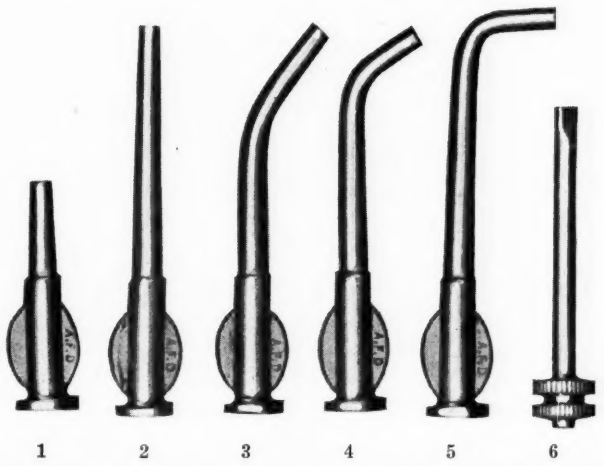


Fig. 3.—Labat extension nozzles and socket-wrench. *1*, Anterior palatine and mental block nozzle; *2*, inferior dental block nozzle; *3*, superior dental and maxillary block nozzle; *4*, sphenopalatine block nozzle; *5*, posterior palatine block nozzle; *6*, socket-wrench for screwing the needle onto the nozzle.

CONNECTION

To connect the parts, select needle and extension nozzle and screw in the needle very gently with the hand, making sure that the threads fit correctly. Then use the socket-wrench by threading the needle through it until it is adjusted to the quadrilateral base of the hub of the needle. Continue to screw until the threads are out of sight and tighten just enough to prevent leakage. Now, connect extension nozzle to syringe *previously filled* with anesthetic solution. Filling the syringe by aspirating with the needle on is detrimental to its parts. This is true of any syringe which may eventually leak or burst. Disconnect the extension nozzle for refilling the syringe.

STERILIZATION

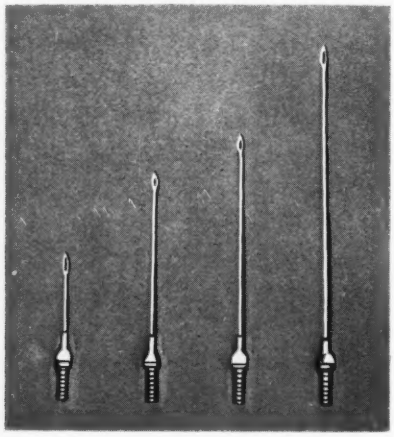
Like the author's 10 c.c. syringe, this dental syringe can be sterilized by boiling or flushing with alcohol or ether; but *the parts must be disconnected before boiling and never reconnected before they are cold.* Good technic re-

quires that syringe, extension nozzles and needles be cold before making connections.

The author's sterilizing tray (Fig. 5) has been specially designed to facilitate sterilization of the whole outfit by immersion in any instrument sterilizer.

If kept in the sterilizing jar, all parts of the outfit should be thoroughly rinsed with normal saline solution (0.9 per cent) before use.

It is not the author's intention to describe the use of each nozzle and each needle. These parts allow of so many combinations that selection is left entirely



1 2 3 4

Fig. 4.—Labat needles for local and regional anesthesia in dental and oral surgery.

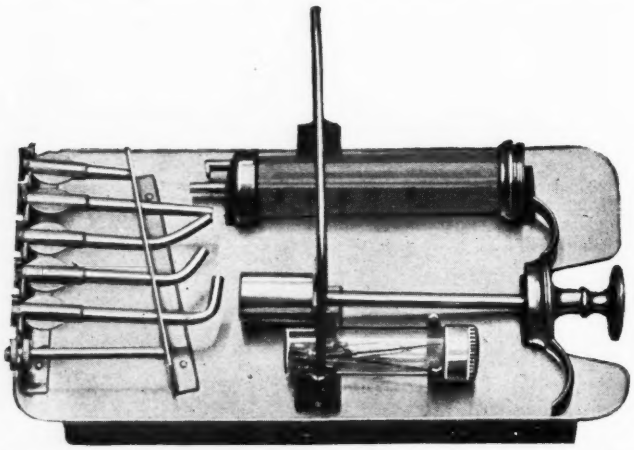


Fig. 5.—Labat outfit. Tray bearing the whole set of instruments.

to individual experience with other types of local anesthesia appliances. It is, however, well to point out the particular advantage of extension nozzle No. 3 (angle of 135°) with needle No. 3 (3 cm.) for the blocking of the posterior superior dental nerves; the same extension nozzle with needle No. 3 (3 cm.) or No. 4 (4 cm.) for that of the maxillary nerve and sphenopalatine ganglion in the sphenomaxillary fossa; extension nozzle No. 4 (angle of 120°) with needle No. 3 (3 cm.) for the sphenopalatine block; extension nozzle No. 5 (angle of 90°) with needle No. 1 (1 cm.) for the posterior palatine block; extension nozzle No. 2 (straight long) with needle No. 4 (4 cm.) for the inferior dental

block. For local infiltration, select the desired extension nozzle and use the short needle.

In presenting this new outfit the writer's aim is to try to meet the demand for a simple, delicate and reliable instrument fulfilling ideal conditions. Encouraged by the popularity of his 10 c.c. syringe in general surgery, he has designed the dental syringe on identical mechanical principles and trusts that

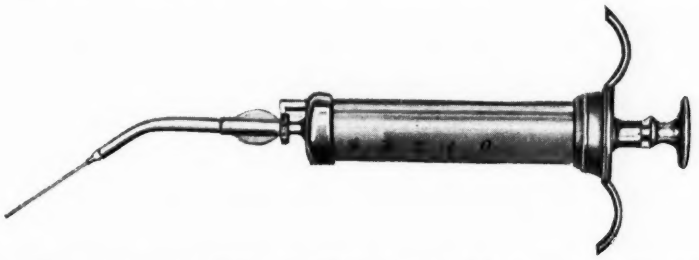


Fig. 6.—Labat syringe connected with extension nozzle No. 3 and needle No. 3, ready for the superior dental block.

the simplicity and ease of manipulation of its bayonet lock connection, extension nozzles and needles, among other features, will merit its general recognition.

In closing, the author wishes to convey his sincere thanks to Messrs. Roure and Duhamel of Paris for their skill in the execution of this outfit and to the Anglo-French Drug Company of New York his high appreciation of their considerable trouble and expense to render its execution and distribution possible.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

Edited By
Clarence O. Simpson, M.D., D.D.S., F.A.C.D.,
and Howard R. Raper, D.D.S., F.A.C.D.

A REFLEX FROM THE TRIGEMINAL BRANCH OF THE SOCIETY*

By Clarence O. Simpson, M.D., D.D.S., F.A.C.D., St. Louis

DOUBTLESS this subject is meaningless to most of the members, because literally the Society has no sections. So was the trigeminal branch of the nervous system unknown until some diligent anatomist traced its distribution and determined its functions. As the only member of the Radiological Society of North America with practice limited to this region, one feels an overwhelming minority in invading this conference on problems apparently of more vital importance. However, the trigeminus has functions which cannot be ignored; it gives warnings which may be of great consequence, and it is the origin of primary and reflex disturbances which profoundly affect the entire organism. May this reflex demonstrate some characteristics, and receive the attention common to other trigeminal reflexes.

General radiologists performed an invaluable service in the early development of oral radiodiagnosis, and in impressing the utility of oral radiography upon the dental profession. Discussions with Dr. Carman twenty years ago gave me, as a recent graduate, the first conception of the scope of radiography in dental and oral surgery. For a period of ten years or more after the discovery of x-rays, the general radiologist made most of the oral examinations, and was largely responsible for the impetus which made radiography indispensable to dentistry. Subsequent evolution has so extended the field of radiology that few practitioners may hope to excel, or adequately serve, in all the diversified branches. We recognize and respect the masters of thoracic and gastroenteric diagnosis, and therapy clinicians who have accomplished the miraculous. It is no more an admission of incompetency for the radiologist to acknowledge limitations in practice than for the physician to heed those established in medicine and surgery, but rather an indication of intelligence and honesty.

A process of discrimination and specialization has during the past decade

*Read before the Radiological Society of North America.
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developed the radiodontist or oral diagnostician of radiology, an inevitable product of the complex phases of clinical dentistry, and the exacting and variable technic of dental radiography. This specialty, with the justification of opportunities for superior service and the solution of neglected problems, has evolved without the sanction or encouragement of the general radiologist, whose support it needs and desires. The radiodontist must not be confused with the technician without professional training who conducts a commercial laboratory, an evil which exists because of the lack of professional standards in those who patronize it, and laxity in the enforcement of the laws regulating dental practice. The radiodontist is an ethical licensed practitioner of dentistry, presumably qualified by education and practical experience to solve the technical problems of dentistry and apply the biologic principles of medicine. The commercial technician is a mechanic engaged in producing and selling radiographs, usually obtaining patronage by advertising, soliciting or commissions.

Radiodontia is in a critical phase of its development, and for rapid and consistent progress demands intensive study within, and loyal support from without. With commercial laboratories paying commissions on "cut-rate" mechanical radiography, or employing doctors with college and association following; with dentists and physicians installing automatic equipment for amateur radiography or to profit from the labor of incompetent assistants; with exodontists circularizing the professions for dental radiography as a "side-line" and promoter of tooth extraction; with hospitals maintaining inefficient radiographic departments by overworked, underpaid visiting supervision, and general radiologists persisting in lame oral diagnosis with camouflaged reports, there is little incentive for specially qualified men to limit their practice to radiodontia. There is no uncertainty about the ultimate status of radiodontia, because a competent radiodontist with professional motives can demonstrate a technical proficiency, diagnostic accuracy, and keen judgment, which establishes a standard of service unapproached by pretenders. However, before radiodontia has the opportunity to supply its maximum service, there must be more discrimination in appraising the character of service, more consideration for the relation of the service to the fee, more regard for the patient's welfare, and less professional jealousy. Hence the appeal to the members of this Society, who have the technical discrimination and should have special interest and pride in the advancement of any branch of radiography.

That radiodontists have elevated the standard of oral radiography and increased the efficiency of oral diagnosis is not a personal reflection on other workers, who make occasional excursions into the field, but a logical result of concentration and zeal in a restricted line of endeavor. There are several reasons why the general radiologist has not prosecuted oral radiography to the attainable limit. His interest and responsibility have been divided in as many directions as there are human organs. He has not had the advantage of clinical experience in dental pathology and surgery. He perhaps has unconsciously depreciated the importance of dental examinations. He has disliked the physical complications of intraoral examinations. He has not

had the deserved cooperation by dentists. Under these handicaps he should not be criticized, but, instead, should be praised for worthy efforts.

The present situation suggests rather obvious obligations of general radiologists in promoting the welfare of humanity and the advancement of radiography. In cities where competent oral radiographers and diagnosticians are located, these specialists should be given spiritual and material support by the general radiologist excluding strictly dental radiography from his practice. In smaller cities where the radiologist is compelled to include dental radiography in his practice, he should, by special preparation, qualify himself to render modern service, or arrange for a dental associate. An appeal to ideals is usually not effective to a great degree unless reinforced by a selfish interest or a penalty. What is the prospect if radiologists do not accept and promote the changed conditions?

Dentists, physicians, and the laity are slowly but inevitably becoming educated to the difference between exposed dental films and a radiodontic examination. It is daily becoming more difficult to take ten "pot-shots," collect a fee, give a clairvoyant reading, and convince anyone else that it is not obtaining money under false pretense. Such practice exposes the operator to ridicule and indefensible censure, it produces a stream of complaints and "retakes," it leads supporters to seek elsewhere for the service, and it makes physicians and dentists decide to install equipment for individual use. The inexorable law of supply and demand applied to service and compensation must be accepted, either amiably or resentfully. Egotism or greed only make capitulation more humiliating. Other divisions of radiography are imminent; if they are sound and progressive they will endure. Why not encourage rather than obstruct?

Radiology is not in an impregnable position. Some of the mystery of the bone-and-bullet days has dissipated. Too many "easy money," "overnight" radiologists have appropriated the superficial knowledge and mechanics of the self-sacrificing pioneers. Too many clown diagnosticians are turning to the exploitation of radiotherapy. Too many specialists in other branches are capitalizing x-ray technicians. Too careless usage of the word "laboratory," which should designate the room containing the x-ray equipment and not the entire establishment of the radiologist, has emphasized machinery rather than brains. The conscientious radiologist who has mastered his vocation is an honor to the medical profession, but there are many detractory satellites.

The Radiological Society of North America has the most potent influence on radiology of any organization in the world. It has revolutionized the dissemination of knowledge pertaining to the science, by its representative membership and intensive programs. No more striking illustration of its influence is evident than the suppression of the roentgen terminology which was foisted upon the medical profession by impulsive worshipers of alien preeminence. Such influence must be wisely directed toward sound principles to avoid destructive tendencies. The prevalent vogue in deep therapy under the stimulus of manufacturers' propaganda has been inordinately reflected in the recent programs of the Society to the regret of numerous mem-

bers. Since the value of deep therapy is yet to be established, and should be established by scientific experimentation rather than empirical application, it seems radically unbecoming of this Society to indulge in a delirium of impressionistic testimonials. Rarely does a therapeutic innovation fail to exceed rational bounds before conservative counsel prevails, and the depressing reaction often temporarily detracts from its real value. The ill-concealed contempt of surgeons, and the shattered hopes of deluded sufferers which may result from the promiscuous application of high voltage therapy without definite methods of calculating dosage or systematized technic, will not add to the prestige of radiology.

The formal recognition of lay technicians by registration as sponsored by the Society is a precarious procedure, with precedented probability of the coddling hand being lacerated. By way of analysis, what legal authority has the Board of the American Registry of Radiological Technicians to issue or revoke certificates to technicians, investigate institutions of training, or control the activities of technicians? Why employ, train, examine or register any but licensed physicians for diagnostic examination of patients, or the treatment of disease by a destructive agent? Would a judge or jury decide that a technician who had been examined and found qualified for specific duties in the office of a radiologist, was not equally qualified to perform the same duties in the office of a chiropractor or in a commercial laboratory? Would the revocation of a certificate deter some technicians from accepting more lucrative employment? Would a legislature if properly lobbied refuse to pass a law authorizing technicians to practice the operations which they had been certified as competent to perform by a representative radiologic organization? Is there any advancement to radiology, or advantages other than financial gain from low salaries, by endorsing lay technicians instead of recruiting medically trained licensed assistants and fortifying radiology as a reputable specialty of medicine?

With an exalted regard for the possibilities of service in radiology, with admiration for the personnel, and confidence in the motives of the Radiological Society of North America, these features are presented in a spirit of constructive criticism, and as a plea for cooperation in a scientific and ethical advancement of the oral branch. Power and guidance to the recently organized American College of Radiologists. May it exclude all extraneous factors in distinguishing the lifters from the leaners, so well described in the following verses by an author whose identity could not be learned:

"There are two kinds of people on earth today,
Just the two kinds—no more, I say.
Not the saint nor the sinner, for 'tis well understood,
The good are half bad and the bad are half good.
Not the rich nor the poor, for to count a man's wealth,
You must first know the state of his conscience and health.
Not the happy nor the sad, for the swift flying years,
Bring to each man his laughter and to each man his tears.

No, the two kinds of people on earth I mean,
Are the people who lift and the people who lean,
And where'er you'll go, you'll find the world's masses
Are always divided into just these two classes.
And oddly enough, you'll find, I ween,
There's only one lifter to many who lean.
In which class are you? Are you easing the load
Of overtaxed lifters who toil on the road,
Or are you a leaner, who makes others bear
Your part of the burden and worry and care?''

ABSTRACT OF
CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Treatment of Peridontoclasia with a Polyvalent Vaccine. T. D. Casto (Philadelphia). The Dental Cosmos, July, 1925, lxvii, 7.

The author states that he can expect to interest only those of his colleagues who believe in the bacteriologic causation of this affection. The method of treatment is not new and the special indications for its use have long been formulated, such as inflammation and hemorrhage about the gingival borders; ulcerative stomatitis; any periodontoclasia in which there is a positive x-ray diagnosis; and as a prophylactic before extracting septic teeth. If it be inconvenient to make an autogenous vaccine the author recommends the Goldenberg polyvalent vaccine of Paris which in accordance with principles enunciated in the Pasteur Institute should be injected directly into the gum into the submucous tissue. A course of treatment should consist of ten injections. The technics are too long for reproduction in detail. The author has now treated twenty-five patients with this vaccine, evidently selected cases.

In the discussion which followed reading the paper, Dr. Luckie stated that many colleagues had used this vaccine with apparently good results but not much is known of the duration of the immunity. Dr. Tassmann, who had worked on the subject in collaboration with the reader of the paper, has gradually become convinced that the treatment fills a place of its own in dentistry. Dr. Rosenthal had seen striking results but thinks the method still in its infancy. Dr. Missimer concurred with this conclusion.

Ocular Complications of Dental Origin. G. Worms and J. Bercher (Paris). La Revue de Stomatologie, April, 1925, xxvii, 4.

The authors, who are members of the stomatologic staff of the Val-de-Grace Military Hospital, speak of the newly awakened interest in France in the American doctrine of focal infection. One phase of this problem, the relation of focal dental infection to eye pathology, first set in motion by Dr. Fromaget, has provoked a number of similar papers, of which the present is one. A number of case histories are given and the authors, unlike some ophthalmologists, find that kerato-conjunctivitis results from dental infection more commonly than uveitis. The affection referred to under the

former title is the old phlyctenular conjunctivitis which was once thought to be due to the scrofulous diathesis. The mechanism, however, is of a type differing from the American idea of dental infection, for in this case the teeth appear to excite neuralgia of the trifacial, so that the ocular lesions may be the result of innervation.

In addition to this type of case the authors mention as second in rank iritis and irido-cyclitis, which corresponds to the experience of American ophthalmologists that uveitis is the most common infection of dental focal origin. A case is given which occurred in a dentist colleague, in which a severe iridio-cyclitis disappeared after extraction of a badly infected bicuspid—the first maxillary left.

Since this type of patient in the authors' experience seems to have suffered likewise from severe intranasal infection, pointing perhaps to sinus disease, the rôle of these disorders in the production of the ocular disease is obscure. The authors appear to believe that the intranasal lesions were factors in producing the former.

Origin and Course of Cancer of the Tongue. J. Djerassi (Sofia). Zahnaertzliche Rundschau, Aug. 16, 1925, xxxiv, 33.

Papers on this subject are very rarely found in dental journals, although the dentist has unusual opportunities of watching the debut of these lesions and knows for example that leukoplakia may be a forerunner of cancer. The author, despite the favorable opportunity of seeing lesions in the formative stage, has found that in most cases the latter were quite far advanced at the first sight of them. In the past four years he has seen four cases, presumably for the first time and before any attempt at diagnosis or treatment. The popular belief that the pain caused by a jagged tooth is the usual cause of bringing these patients to the dentist's office is not borne out in his practice. He agrees with Williger that neither sharp teeth nor prosthesis is the factor which usually first calls the patient's attention to the lesion. But it is undoubtedly true that in certain cases this factor is the efficient cause of a cancer of the tongue or buccal mucosa. Some patients are singularly insensitive and it is their indifference to the irritation from sharp teeth that is the real occasion for the development of the lesion. Because ordinarily a man would seek relief from such a burden at a very early period, long before there would have been time for a malignant condition to develop. In one case the patient made visits a year apart. On the first visit there was no sign of a lesion, but one of the bicuspids appeared to be a source of irritation, or ought to have been, although the patient made no complaint. One year later there was a large malignant ulcer at the site of irritation. In another case the patient has smoker's patches and fearing cancerous degeneration consulted a surgeon annually. After ten years' supervision of this kind (the patient could not break himself in the meantime of smoking) the large leukoplakia lesion on the tongue actually showed malignant degeneration. Operation was refused by the surgeon because the patient had angina pectoris, which last ailment ended his life long before his expectation from the cancer.

A third patient was a heavy smoker, although apparently he had not developed smokers' patches. The author was consulted to extract an irritating root but at the first visit saw that a malignant ulcer had actually formed. Extraction naturally brought relief and the bleeding stopped. The man had no conception of the seriousness of the situation and volunteered to return as soon as the ulcer healed to have his mouth put in shape. For some reason the author did not attempt to disillusion him, which turned out for the best, for the man died very soon after from an aspiration pneumonia.

The fourth patient of this series was a woman in which sex cancer of the tongue is notably rare. She was a peasant who came for total exodontia on account of hampered mobility of the tongue. A lesion was found beneath the organ, one which had already been treated at the town baths with the cautery. An advanced cancer was diagnosticated by the author. The woman had never smoked and there was no evidence of dental irritation. The author referred her to the surgical clinic but she was never heard of again, although a wretched death was a foregone conclusion.

Relation of Systemic Infection to Dental Disease. R. Pemberton (Philadelphia). Annals of Clinical Medicine, April, 1925, iii, 10.

The author enumerates in the order of importance cardiac disease, and the arthritic syndrome, the latter being more numerous, as consequences of dental and other focal infection. Under heart disease belongs pericarditis as well as myocarditis and endocarditis, and under the arthritic syndrome myositis, neuritis and chorea. The author also enumerates nephritis, pancreatitis, gastric ulcer, diseases of the thyroid, various skin diseases and functional nervous diseases, as probable consequences of focal infection. Analysis of 100 running cases in the medical wards of hospitals without mention of the diagnosis showed tonsil or sinus infection in 60 per cent, dental infection in 58 per cent and genitourinary infection in 34 per cent. Pyorrhea was more common than apical infection by nearly 2 to 1. Of the 100 patients sixteen had heart disease, twelve kidney disease, ten arthritis.

During the war the author examined 400 soldiers with arthritis and found surgical foci in 73 per cent; tonsillar foci in 52 per cent; dental foci in 33.5 per cent and genitourinary in 12.4 per cent. In other large material of the same character dental foci have surpassed tonsillar in frequency. However, it does not do to make this factor responsible for too much pathology, for it is simply one of several. Other causal elements of quite a different nature may set up the same symptoms. One is a life of exposure to bad weather. Again very different plans of treatment may be equally efficacious as a special diet, or the use of nonprotein therapy, even if the offending focus is left undisturbed.

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EDITORIALS

The Commission Evil

AT various times during the past few years, we have called attention to the commission question which like the "Poor" seems to be always with us. In spite of the fact that the Code of Ethics of the American Dental Association, American Society of Orthodontists and various other constituent societies contains resolutions against paying of commissions, we find the custom seems to be increasing instead of decreasing. Not only do we find it customary among certain orthodontists to pay commissions, but we find oral surgeons, peridontists, radiographers and prosthetic men all troubled with the same problem.

To the man who does not pay commissions or come in contact with the problem, the statement that the habit is prevalent, will probably sound appalling. Nevertheless, from information which we have obtained from various sources, we fully believe that the paying of commissions, dividing of fees and

accepting of rebates and granting of "professional courtesies" is very common practice. We find the above-mentioned terms used by men with reference to the paying of commissions; however, the result is exactly the same.

In order that we may substantiate the statement that the paying of commission is upon the increase, we recently had an opportunity to examine the evidence which had been obtained by a committee appointed by a large dental society to investigate the prevalence of the commission habit and to make recommendations in regard to curbing it. One of the first pieces of evidence was obtained from a member of the society who had sent out an announcement that he would grant professional rebates on radiographic references. As a result of this announcement his practice increased $900.00 the first month. After sending out another announcement stating that no professional courtesies would be granted, the new business dropped off. It was our privilege to privately examine the bookkeeping system of a radiographic laboratory and it was needless to say that we were surprised to see the men prominent in the dental profession who were willing to accept commissions for patients referred. In fact, it is such common practice for men in the dental profession to accept and solicit commissions that radiographic laboratories have been opened and businesses have been built up advertising the fact that "Professional Courtesies will be granted."

It was also found that the practice of granting rebates is common among oral surgeons. Men have large practices and are maintaining them because of this habit of paying commissions. In some instances a different percentage is paid when a certain fee is obtained for extraction, and, if a larger fee is collected a higher percentage is given. This evidence was obtained by listening to a telephone conversation between a dentist and an exodontist in regard to the reference of patients. The exodontist stated a rising scale of commissions depended upon the amount of the fee. This increase of the commission as the fee is increased is so prevalent that many specialists will not name a fee to the patient until after they have consulted the dentist who has referred the patient.

Radiographers, exodontists and oral surgeons are not the only ones paying commissions. We find the orthodontic profession is just as badly afflicted with the professional rebate giver. This is indeed unfortunate because we find some of the younger orthodontists are justifying their action by stating that some of the older men in the practice of orthodontia gave commissions years ago, and unfortunately the younger men are correct in their statement. However, the younger generation seems to forget that "Two wrongs do not make a right."

That the orthodontists pay commissions is proved by statements from dentists and also by other facts which have been brought to our attention. It is a common thing to be called to the phone and have a dentist ask frankly what he will receive if he will refer a patient to us. When he is informed that we do not pay commissions he will then make the statement that he will refer the patient to us provided he can find no one to give him a professional rebate. We never see the patient.

The prevalence of the "professional rebate" was also brought to our attention by a statement made by a young orthodontist who is building up a practice. When talking with dentists they often ask him what he will give them if they refer orthodontic patients to him. When he makes the statement that it is not customary for orthodontists to pay commissions, he is practically laughed out of the "court." Many dentists send patients to the orthodontist who gives the largest professional rebate. An investigation was started in regard to the truthfulness of this situation and we were greatly surprised to find that at this day and age a large number of orthodontists and still greater number of the dental profession were engaged in the practice of fee-splitting. Some of the men in the dental profession when interviewed in regard to the fee-splitting question, stated that they could see no reason why they should maintain an office and pay rent for the purpose of referring patients to a specialist if they did not get something out of it. They further justified their act by stating that many commercial transactions are entirely on a commission basis. They further argue that there is no law against the granting and receiving of professional courtesies; which fact is true in certain states.

A few years ago, Kansas and Texas, passed a law against dental and medical men's dividing fees and so far as we know, no case was ever tried. Probably the division of fees is just as prevalent in those states now as it was before the passage of the law. A great many men believe fee-splitting is a perfectly honest transaction because it breaks no legal statute and they want to believe it is honorable because it is to their advantage to think so. However, professional services cannot be compared with commercial transactions, because a commercial article is bought and it is more or less standard; but, a professional service depends upon the ability of the man who renders it, and consequently the value of orthodontic services cannot be estimated the same as one can figure the value of a manufactured product. It is, therefore, unfortunate for the public to have professional men who are willing to place professional services on the basis of a commercial transaction. One of the greatest arguments against the paying of commissions is the tendency for men to refer patients to the specialist who pays the largest commission regardless of his ability. Also if the transaction were correct and one of which the public approved, it would be proper for the dentist referring the patient to say, "I am going to send you to Dr. So-and-so, who is a specialist, and 20 per cent of what he charges you will be paid me for making this reference." If such a plan as this was followed and the public knew of the transaction, there would be nothing wrong; but, instead of such being the case we find every means is taken to prevent the patient's knowing it.

We also find that many plans are followed to prevent any record of such transactions: It is a common practice for a radiographic laboratory to send stamps or cash to the man who referred the patient. This remuneration is accomplished by a bank slip without any name on it, stating that the enclosed amount is the "amount due for cases referred the past month." It is true this remittance may come in a letter bearing the address of the radiographic laboratory, but when taken to court it would not be evidence because any one

could have used and obtained an envelope by one way or another. An envelope bearing the address of the laboratory could be used without making the laboratory a party in the transaction. However, some laboratories and specialists are not so careful, as we have seen checks from specialists to dentists. However, it would be impossible to state the reason for the check. In one instance the dentist received a check from the specialist and he called the specialist on the phone and asked him why he had received the check. The specialist replied that it was a mistake and asked that the check be returned. In other words it was impossible to obtain evidence as to why the check had been sent.

We have called attention to this evil, but unfortunately we have no remedy to suggest. We do not believe the trouble lies so much with the specialist as it does with the larger number of the dental profession who accept rebates. As long as the profession is in favor of commissions and the division of fees there will always be some one willing to practice a specialty upon that basis. The only plan that would accomplish any result is the education of the profession against the unethical action of dividing fees.

An Unusual Petition

WE are in receipt of a communication from Bellingham, Washington, calling our attention to a petition which was sent to the City Council by Dr. E. H. Stanley. The petition reads as follows:

"I, Dr. E. H. Stanley, of Bellingham, Wash., ask the privilege and authority to decorate the Naso-Gymnastic Path with permanent signs. The signs will be small and neat; they will be distributed at appropriate distances along the entire path. The path itself begins at the Masonic Temple on Elk Steet, crosses Elk and up the hill; passing Christian Science, Presbyterian and Lutheran Churches; then south to the top of the first rise, which constitutes the first half. The second half extends to the top of Seaholm Hill. The entire development scheme cannot be printed on these tiny cards, or signs, but they serve as a perpetual reminder. Six months' training the youth of Whatcome County on this path will establish its value.

"The United States estimate, sent out to medical men, is that fifty-five per cent of the youth of America are Subnormal. This is due to haphazard method, or lack of any method in the growth control of children which leaves the well-known deformities of crooked teeth; uneven nasal passages; distal chins; adenoids within and spoiled faces without. All these conditions can be vastly improved, even when begun late; and can be entirely prevented when begun early in life; six to ten, by the preventive measures of Naso-gymnastics. This is a simple method of directing the growth of children in the neglected region of the face. They exercise entirely without lotions or instruments, ample, free, and even air passages during the period of rapid growth from six to twelve. The path is an adjunct to that perfect development.

"If found to be successful in Bellingham, the path and plans will be copied everywhere. This idea I am determined shall not be commercialized. It is my

opportunity, as discoverer of the system, to leave it as my part of civilization to the youth of America.''

The Council has granted this request and are now waiting for results. The communication we received failed to state whether signs had been placed; neither did our informer give us more details in regard to the Naso-Gymnastic Path than are contained in the petition.

We are at a loss to know whether the plan suggested in the petition will produce results or not. Success can only be judged by future developments. We shall watch this experiment with interest.

Errata

In the article by Dr. Robert Friedman, page 852, September issue, third paragraph, fourth line, the word barvital should be ''barbital''; fourth paragraph, first line, should read ''The average minimal lethal dose of these drugs is believed to be 50 grains''; fifth paragraph, page 853, line 4, the word aminopyrin should be ''amidopyrin.''

ORTHODONTIC NEWS AND NOTES

The Dental Society of the State of New York

The Dental Society of the State of New York will hold the fifty-eighth annual meeting at the Hotel Astor, New York City, May 19, 20, 21 and 22, 1926. All literary exercises, clinics and exhibits will be staged at the Hotel Astor.

The society extends a cordial welcome to all ethical dentists.

Exhibitors are requested to address Dr. H. C. Bennett, Chairman of the Exhibits Committee, 576 Fifth Avenue, New York City, for information and space.

Educational courses will be conducted on Monday, Tuesday and Wednesday, May 17, 18 and 19. Address Dr. Edward Kennedy, Chairman of the Educational Courses, 347 Fifth Avenue, New York City, for information and enrollment.

Make reservations early at the Hotel Astor.

A. P. Burkhart (Secretary),
57 East Genesee Street,
Auburn, N. Y.

A Meeting to Make Better Dentistry Practical

It is difficult for most dentists to apply much of the best scientific information as it is generally presented in meetings. They and their patients are serious losers.

The first District Dental Society proposes to devote its December meeting to the application of science to practice. There will be no finely spun theories and no effort to develop new knowledge. We are going to find out how to use at the chair what we think we already know.

If This Interests You
Plan to Come!

All sessions and clinics at Hotel Pennsylvania, December 2, 3, 4, 1925. Write now for reservations.

For further information address: E. M. Davies, Gen'l Secretary, 250 West 57th Street, New York, N. Y. First District Dental Society of the State of New York.

News and Notes

Mrs. Stephen Thrall announces the marriage of her daughter, Virginia Miller, to Doctor Paul Donovan Lewis, Tuesday, the twenty-fifth of August, One thousand nine hundred and twenty-five, Everett, Washington.

Dr. Walter H. Ellis announces the removal of his office to The Parke, Gates Circle, Buffalo, New York. Practice limited to orthodontia.

Dr. Harry B. Wright announces the removal of his office to Suite 723 Medical Arts Bldg., Sixteenth and Walnut Streets, Philadelphia, Pa. Practice limited to orthodontia.

Dr. George N. Abbott, formerly associated with Dr. Sidney B. Sargent, announces the opening of an office at the New Quinlan Building, 246 Walnut Street, Newtonville, Mass. Practice limited to orthodontia.

Dr. Franklin A. Squires announces the removal of his office to 62 Hamilton Avenue, White Plains, N. Y. Orthodontia exclusively.

Dr. E. P. Beadles announces the opening of his office at 205 Medical Arts Building, Norfolk, Va., for the exclusive practice of oral surgery.

Dr. Ralph H. Drury announces the removal of his office to 332 Main Street, Worcester, Mass. Practice limited to orthodontia.

Dr. J. D. Odeneal wishes to announce that he has located in Tampa, Florida, 214 Ferlita Bldg., temporary location, for the exclusive practice of orthodontia.

Drs. E. W. Patton and F. F. Perry announce the opening of their offices at 725-26 First National Bank Bldg., Birmingham, Ala. Orthodontia exclusively.

Dr. F. Nicolai announces the removal of his office to 42 Livingston Street, Brooklyn, N. Y. Practice limited to orthodontia.

Dr. Albert C. Holzman announces the removal of his offices to 353 Commonwealth Ave., Boston, Mass. Practice limited to orthodontia.

Dr. Joseph J. Stahl announces the opening of his office at 110 West 42nd Street, New York City. Practice limited to orthodontia.

Dr. Andrew Francis Jackson announces the removal of his offices to 1216-1219 Medical Arts Building, N. W. Corner 16th and Walnut Streets, Philadelphia, Pa. Practice limited to orthodontia.